



Cisco IOS CMTS Cable Command Reference

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Introduction

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This introduction explains the objectives, intended audience, and organization of the *Cisco IOS CMTS Cable Command Reference*. It provides the following sections:

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- [Audience, page 2](#)
- [Document Organization, page 2](#)
- [Using the Command-Line Interface in Cisco IOS Software, page 2](#)
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Document Objectives



Note

Some of these products have reached End of Sale (EOS) or End of Life (EOL). For more information, refer to the Video, Cable, and Content Delivery End-of-Sale and End-of-Life Products site at: http://www.cisco.com/en/US/products/hw/video/prod_category_end_of_life.html

This guide describes the commands necessary to configure, maintain, and troubleshoot the following cable platforms:

- Cisco Cable Modem Termination Systems (CMTS)
 - Cisco uBR7200 series universal broadband routers, which include the Cisco uBR7246, the Cisco uBR7246 VXR, and the Cisco uBR7225VXR routers.
 - Cisco uBR10012 universal broadband router.
- Cisco Cable Modems (CMs) and other Cable CPE Devices
 - Cisco uBR904, Cisco uBR905, Cisco uBR924, and Cisco uBR925 cable access routers.
 - Cisco CVA122 and Cisco CVA122E cable voice adapters.



Note

This guide documents only cable-specific commands. For information about all Cisco IOS commands, use the [Command Lookup Tool](#) or the [Cisco IOS Master Command List, All Releases](#).

Audience

This book is intended for system administrators and support engineers who configure and maintain the cable CMTS and CM devices.

Document Organization

This book is organized alphabetically. The first page of each chapter provides a command summary of all commands included in that chapter, as well as identification of any new, modified, obsolete, or replaced commands.

Debug commands and ROM monitor commands are included in separate appendixes at the end of the book.

Using the Command-Line Interface in Cisco IOS Software

This section provides basic information about the command-line interface (CLI) in Cisco IOS software and how you can use some of the CLI features.

- [Initially Configuring a Device, page 2](#)
- [Using the CLI, page 3](#)
- [Saving Changes to a Configuration, page 12](#)
- [Additional Information, page 13](#)

For more information about using the CLI, see the “[Using the Cisco IOS Command-Line Interface](#)” section of the *Cisco IOS Configuration Fundamentals Configuration Guide*.

For information about the software documentation set, see the “[About Cisco IOS Software Documentation](#)” document.

Initially Configuring a Device

Initially configuring a device varies by platform. For information about performing an initial configuration, see the hardware installation documentation that is provided with the original packaging of the product or go to the Product/Technologies Support area of Cisco.com at <http://www.cisco.com/go/techdocs>.

After you have performed the initial configuration and connected the device to your network, you can configure the device by using the console port or a remote access method, such as Telnet or Secure Shell (SSH), to access the CLI or by using the configuration method provided on the device, such as Security Device Manager.

Changing the Default Settings for a Console or AUX Port

There are only two changes that you can make to a console port and an AUX port:

- Change the port speed with the **config-register 0x** command. Changing the port speed is not recommended. The well-known default speed is 9600.
- Change the behavior of the port; for example, by adding a password or changing the timeout value.

**Note**

The AUX port on the Route Processor (RP) installed in a Cisco ASR 1000 series router does not serve any useful customer purpose and should be accessed only under the advisement of a customer support representative.

Using the CLI

This section describes the following topics:

- [Understanding Command Modes, page 3](#)
- [Using the Interactive Help Feature, page 6](#)
- [Understanding Command Syntax, page 7](#)
- [Understanding Enable and Enable Secret Passwords, page 8](#)
- [Using the Command History Feature, page 9](#)
- [Abbreviating Commands, page 10](#)
- [Using Aliases for CLI Commands, page 10](#)
- [Using the no and default Forms of Commands, page 10](#)
- [Using the debug Command, page 11](#)
- [Filtering Output Using Output Modifiers, page 11](#)
- [Understanding CLI Error Messages, page 12](#)

Understanding Command Modes

The CLI command mode structure is hierarchical, and each mode supports a set of specific commands. This section describes the most common of the many modes that exist.

[Table 1](#) lists common command modes with associated CLI prompts, access and exit methods, and a brief description of how each mode is used.

Table 1 **CLI Command Modes**

Command Mode	Access Method	Prompt	Exit Method	Mode Usage
User EXEC	Log in.	Router>	Issue the logout or exit command.	• Change terminal settings. • Perform basic tests. • Display device status.
Privileged EXEC	From user EXEC mode, issue the enable command.	Router#	Issue the disable command or the exit command to return to user EXEC mode.	• Issue show and debug commands. • Copy images to the device. • Reload the device. • Manage device configuration files. • Manage device file systems.
Global configuration	From privileged EXEC mode, issue the configure terminal command.	Router(config)#	Issue the exit command or the end command to return to privileged EXEC mode.	Configure the device.
Interface configuration	From global configuration mode, issue the interface command.	Router(config-if)#	Issue the exit command to return to global configuration mode or the end command to return to privileged EXEC mode.	Configure individual interfaces.
Line configuration	From global configuration mode, issue the line vty or line console command.	Router(config-line)#	Issue the exit command to return to global configuration mode or the end command to return to privileged EXEC mode.	Configure individual terminal lines.

Table 1 *CLI Command Modes (continued)*

Command Mode	Access Method	Prompt	Exit Method	Mode Usage
ROM monitor	From privileged EXEC mode, issue the reload command. Press the Break key during the first 60 seconds while the system is booting.	rommon # > The # symbol represents the line number and increments at each prompt.	Issue the continue command.	- Run as the default operating mode when a valid image cannot be loaded. - Access the fall-back procedure for loading an image when the device lacks a valid image and cannot be booted. - Perform password recovery when a Ctrl-Break sequence is issued within 60 seconds of a power-on or reload event.
Diagnostic (available only on Cisco ASR 1000 series routers)	The router boots or enters diagnostic mode in the following scenarios. When a Cisco IOS process or processes fail, in most scenarios the router will reload. - A user-configured access policy was configured using the transport-map command, which directed the user into diagnostic mode. - The router was accessed using an RP auxiliary port. - A break signal (Ctrl-C, Ctrl-Shift-6, or the send break command) was entered, and the router was configured to enter diagnostic mode when the break signal was received.	Router (diag) #	If a Cisco IOS process failure is the reason for entering diagnostic mode, the failure must be resolved and the router must be rebooted to exit diagnostic mode. If the router is in diagnostic mode because of a transport-map configuration, access the router through another port or use a method that is configured to connect to the Cisco IOS CLI. If the RP auxiliary port was used to access the router, use another port for access. Accessing the router through the auxiliary port is not useful for customer purposes.	- Inspect various states on the router, including the Cisco IOS state. - Replace or roll back the configuration. - Provide methods of restarting the Cisco IOS software or other processes. - Reboot hardware (such as the entire router, an RP, an ESP, a SIP, a SPA) or other hardware components. - Transfer files into or off of the router using remote access methods such as FTP, TFTP, and SCP.

EXEC commands are not saved when the software reboots. Commands that you issue in a configuration mode can be saved to the startup configuration. If you save the running configuration to the startup configuration, these commands will execute when the software is rebooted. Global configuration mode is the highest level of configuration mode. From global configuration mode, you can enter a variety of other configuration modes, including protocol-specific modes.

ROM monitor mode is a separate mode that is used when the software cannot load properly. If a valid software image is not found when the software boots or if the configuration file is corrupted at startup, the software might enter ROM monitor mode. Use the question symbol (?) to view the commands that you can use while the device is in ROM monitor mode.

```
rommon 1 > ?
alias                set and display aliases command
boot                 boot up an external process
confreg              configuration register utility
cont                 continue executing a downloaded image
context              display the context of a loaded image
cookie               display contents of cookie PROM in hex
.
.
.
rommon 2 >
```

The following example shows how the command prompt changes to indicate a different command mode:

```
Router> enable
Router# configure terminal
Router(config)# interface ethernet 1/1
Router(config-if)# ethernet
Router(config-line)# exit
Router(config)# end
Router#
```


Note

A keyboard alternative to the **end** command is Ctrl-Z.

Using the Interactive Help Feature

The CLI includes an interactive Help feature. [Table 2](#) describes the purpose of the CLI interactive Help commands.

Table 2 *CLI Interactive Help Commands*

Command	Purpose
help	Provides a brief description of the Help feature in any command mode.
?	Lists all commands available for a particular command mode.
<i>partial command?</i>	Provides a list of commands that begin with the character string (no space between the command and the question mark).
<i>partial command<Tab></i>	Completes a partial command name (no space between the command and <Tab>).
<i>command ?</i>	Lists the keywords, arguments, or both associated with the command (space between the command and the question mark).
<i>command keyword ?</i>	Lists the arguments that are associated with the keyword (space between the keyword and the question mark).

The following examples show how to use the help commands:

help

```
Router> help
```

Help may be requested at any point in a command by entering a question mark '?'. If nothing matches, the help list will be empty and you must backup until entering a '?' shows the available options.

Two styles of help are provided:

1. Full help is available when you are ready to enter a command argument (e.g. 'show ?') and describes each possible argument.
2. Partial help is provided when an abbreviated argument is entered and you want to know what arguments match the input (e.g. 'show pr?').

?

```
Router# ?
```

Exec commands:

access-enable	Create a temporary access-List entry
access-profile	Apply user-profile to interface
access-template	Create a temporary access-List entry
alps	ALPS exec commands
archive	manage archive files

```
<snip>
```

partial command?

```
Router(config)# zo?
```

```
zone zone-pair
```

partial command<Tab>

```
Router(config)# we<Tab> webvpn
```

command?

```
Router(config-if)# pppoe ?
```

enable	Enable pppoe
max-sessions	Maximum PPPOE sessions

command keyword?

```
Router(config-if)# pppoe enable ?
```

group	attach a BBA group

```
<cr>
```

Understanding Command Syntax

Command syntax is the format in which a command should be entered in the CLI. Commands include the name of the command, keywords, and arguments. Keywords are alphanumeric strings that are used literally. Arguments are placeholders for values that a user must supply. Keywords and arguments may be required or optional.

Specific conventions convey information about syntax and command elements. [Table 3](#) describes these conventions.

Table 3 **CLI Syntax Conventions**

Symbol/Text	Function	Notes
< > (angle brackets)	Indicate that the option is an argument.	Sometimes arguments are displayed without angle brackets.
A.B.C.D.	Indicates that you must enter a dotted decimal IP address.	Angle brackets (< >) are not always used to indicate that an IP address is an argument.
WORD (all capital letters)	Indicates that you must enter one word.	Angle brackets (< >) are not always used to indicate that a WORD is an argument.
LINE (all capital letters)	Indicates that you must enter more than one word.	Angle brackets (< >) are not always used to indicate that a LINE is an argument.
<cr> (carriage return)	Indicates the end of the list of available keywords and arguments, and also indicates when keywords and arguments are optional. When <cr> is the only option, you have reached the end of the branch or the end of the command if the command has only one branch.	—

The following examples show syntax conventions:

```
Router(config)# ethernet cfm domain ?
WORD domain name
Router(config)# ethernet cfm domain dname ?
level
Router(config)# ethernet cfm domain dname level ?
<0-7> maintenance level number
Router(config)# ethernet cfm domain dname level 7 ?
<cr>

Router(config)# snmp-server file-transfer access-group 10 ?
protocol protocol options
<cr>

Router(config)# logging host ?
Hostname or A.B.C.D IP address of the syslog server
ipv6 Configure IPv6 syslog server
```

Understanding Enable and Enable Secret Passwords

Some privileged EXEC commands are used for actions that impact the system, and it is recommended that you set a password for these commands to prevent unauthorized use. Two types of passwords, enable (not encrypted) and enable secret (encrypted), can be set. The following commands set these passwords and are issued in global configuration mode:

- **enable** *password*
- **enable secret** *password*

Using an enable secret password is recommended because it is encrypted and more secure than the enable password. When you use an enable secret password, text is encrypted (unreadable) before it is written to the config.text file. When you use an enable password, the text is written as entered (readable) to the config.text file.

Each type of password is case sensitive, can contain from 1 to 25 uppercase and lowercase alphanumeric characters, and can start with a numeral. Spaces are also valid password characters; for example, “two words” is a valid password. Leading spaces are ignored, but trailing spaces are recognized.

**Note**

Both password commands have numeric keywords that are single integer values. If you choose a numeral for the first character of your password followed by a space, the system will read the number as if it were the numeric keyword and not as part of your password.

When both passwords are set, the enable secret password takes precedence over the enable password.

To remove a password, use the **no** form of the commands: **no enable password** or **no enable secret password**.

For more information about password recovery procedures for Cisco products, see the following:

http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products_tech_note09186a00801746e6.shtml

Using the Command History Feature

The command history feature saves, in a command history buffer, the commands that you enter during a session. The default number of saved commands is 10, but the number is configurable within the range of 0 to 256. This command history feature is particularly useful for recalling long or complex commands.

To change the number of commands saved in the history buffer for a terminal session, issue the **terminal history size** command:

```
Router# terminal history size num
```

A command history buffer is also available in line configuration mode with the same default and configuration options. To set the command history buffer size for a terminal session in line configuration mode, issue the **history** command:

```
Router(config-line)# history [size num]
```

To recall commands from the history buffer, use the following methods:

- Press Ctrl-P or the Up Arrow key—Recalls commands beginning with the most recent command. Repeat the key sequence to recall successively older commands.
- Press Ctrl-N or the Down Arrow key—Recalls the most recent commands in the history buffer after they have been recalled using Ctrl-P or the Up Arrow key. Repeat the key sequence to recall successively more recent commands.

**Note**

The arrow keys function only on ANSI-compatible terminals such as the VT100.

- Issue the **show history** command in user EXEC or privileged EXEC mode—Lists the most recent commands that you entered. The number of commands that are displayed is determined by the setting of the **terminal history size** and **history** commands.

The command history feature is enabled by default. To disable this feature for a terminal session, issue the **terminal no history** command in user EXEC or privileged EXEC mode or the **no history** command in line configuration mode.

Abbreviating Commands

Typing a complete command name is not always required for the command to execute. The CLI recognizes an abbreviated command when the abbreviation contains enough characters to uniquely identify the command. For example, the **show version** command can be abbreviated as **sh ver**. It cannot be abbreviated as **s ver** because **s** could mean **show**, **set**, or **systat**. The **sh v** abbreviation also is not valid because the **show** command has **vrrp** as a keyword in addition to **version**. (Command and keyword examples are from Cisco IOS Release 12.4(13)T.)

Using Aliases for CLI Commands

To save time and the repetition of entering the same command multiple times, you can use a command alias. An alias can be configured to do anything that can be done at the command line, but an alias cannot move between modes, type in passwords, or perform any interactive functions.

Table 4 shows the default command aliases.

Table 4 *Default Command Aliases*

Command Alias	Original Command
h	help
lo	logout
p	ping
s	show
u or un	undebug
w	where

To create a command alias, issue the **alias** command in global configuration mode. The syntax of the command is **alias mode command-alias original-command**. Following are some examples:

- Router(config)# **alias exec prt partition**—privileged EXEC mode
- Router(config)# **alias configure sb source-bridge**—global configuration mode
- Router(config)# **alias interface rl rate-limit**—interface configuration mode

To view both default and user-created aliases, run the **show alias** command.

Using the no and default Forms of Commands

Most configuration commands have a **no** form that is used to reset a command to its default value or to disable a feature or function. For example, the **ip routing** command is enabled by default. To disable this command, you would issue the **no ip routing** command. To re-enable IP routing, you would issue the **ip routing** command.

Configuration commands may also have a **default** form, which returns the command settings to their default values. For commands that are disabled by default, using the **default** form has the same effect as using the **no** form of the command. For commands that are enabled by default and have default settings,

the **default** form enables the command and returns the settings to their default values. To see what **default** commands are available on your system, enter **default ?** in the appropriate command mode of the command-line interface.

The **no** form is documented in the command pages of Cisco IOS command references. The **default** form is generally documented in the command pages only when the **default** form performs a function different than that of the plain and **no** forms of the command.

Command pages often include a “Command Default” section as well. The “Command Default” section documents the state of the configuration if the command is not used (for configuration commands) or the outcome of using the command if none of the optional keywords or arguments is specified (for EXEC commands).

Using the debug Command

A **debug** command produces extensive output that helps you troubleshoot problems in your network. These commands are available for many features and functions within Cisco IOS software. Some **debug** commands are **debug all**, **debug aaa accounting**, and **debug mpls packets**. To use **debug** commands during a Telnet session with a device, you must first enter the **terminal monitor** command. To turn off debugging completely, you must enter the **undebg all** command.

For more information about **debug** commands, see the *Cisco IOS Debug Command Reference*:

http://www.cisco.com/en/US/docs/ios/debug/command/reference/db_book.html



Caution

Debugging is a high priority and high CPU utilization process that can render your device unusable. Use **debug** commands only to troubleshoot specific problems. The best times to run debugging are during periods of low network traffic and when few users are interacting with the network. Debugging during these periods decreases the likelihood that the **debug** command processing overhead will affect network performance or user access or response times.

Filtering Output Using Output Modifiers

Many commands produce lengthy output that may use several screens to display. Using output modifiers, you can filter this output to show only the information that you want to see.

The following three output modifiers are available:

- **begin** *regular-expression*—Displays the first line in which a match of the regular expression is found and all lines that follow.
- **include** *regular-expression*—Displays all lines in which a match of the regular expression is found.
- **exclude** *regular-expression*—Displays all lines except those in which a match of the regular expression is found.

To use one of these output modifiers, type the command followed by the pipe symbol (|), the modifier, and the regular expression that you want to search for or filter. A regular expression is a case-sensitive alphanumeric pattern. It can be a single character or number, a phrase, or a more complex string.

The following example illustrates how to filter output of the **show interface** command to display only lines that include the expression “protocol.”

```
Router# show interface | include protocol
```

```
FastEthernet0/0 is up, line protocol is up
Serial4/0 is up, line protocol is up
Serial4/1 is up, line protocol is up
```

```
Serial4/2 is administratively down, line protocol is down
Serial4/3 is administratively down, line protocol is down
```

Understanding CLI Error Messages

You may encounter some error messages while using the CLI. [Table 5](#) shows the common CLI error messages.

Table 5 Common CLI Error Messages

Error Message	Meaning	How to Get Help
% Ambiguous command: "show con"	You did not enter enough characters for the command to be recognized.	Reenter the command followed by a space and a question mark (?). The keywords that you are allowed to enter for the command appear.
% Incomplete command.	You did not enter all the keywords or values required by the command.	Reenter the command followed by a space and a question mark (?). The keywords that you are allowed to enter for the command appear.
% Invalid input detected at "^" marker.	You entered the command incorrectly. The caret (^) marks the point of the error.	Enter a question mark (?) to display all the commands that are available in this command mode. The keywords that you are allowed to enter for the command appear.

For more system error messages, see the [Cisco IOS Release 12.4T System Message Guide](#).

Saving Changes to a Configuration

To save changes that you made to the configuration of a device, you must issue the **copy running-config startup-config** command or the **copy system:running-config nvram:startup-config** command. When you issue these commands, the configuration changes that you made are saved to the startup configuration and saved when the software reloads or power to the device is turned off or interrupted. The following example shows the syntax of the **copy running-config startup-config** command:

```
Router# copy running-config startup-config
Destination filename [startup-config]?
```

You press Enter to accept the startup-config filename (the default), or type a new filename and then press Enter to accept that name. The following output is displayed indicating that the configuration was saved.

```
Building configuration...
[OK]
Router#
```

On most platforms, the configuration is saved to NVRAM. On platforms with a Class A flash file system, the configuration is saved to the location specified by the CONFIG_FILE environment variable. The CONFIG_FILE variable defaults to NVRAM.

Additional Information

- “Using the Cisco IOS Command-Line Interface” section of the *Cisco IOS Configuration Fundamentals Configuration Guide*
http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_cli-basics.html
- Cisco Product/Technology Support
<http://www.cisco.com/go/techdocs>
- Support area on Cisco.com (also search for documentation by task or product)
<http://www.cisco.com/en/US/support/index.html>
- Software Download Center (downloads; tools; licensing, registration, advisory, and general information) (requires Cisco.com user ID and password)
<http://www.cisco.com/kobayashi/sw-center/>
- Error Message Decoder, a tool to help you research and resolve error messages for Cisco IOS software
<http://www.cisco.com/cgi-bin/Support/Errordecoder/index.cgi>
- Command Lookup Tool, a tool to help you find detailed descriptions of Cisco IOS commands (requires Cisco.com user ID and password)
<http://tools.cisco.com/Support/CLILookup>
- Output Interpreter, a troubleshooting tool that analyzes command output of supported **show** commands
<https://www.cisco.com/cgi-bin/Support/OutputInterpreter/home.pl>

Related Documents

This section lists the other documents that provide more detailed hardware and software information about the Cisco CMTS routers and Cisco Cable CPE devices documented in this guide. These documents are available on Cisco.com and the customer documentation CD-ROM.

Cisco CMTS Hardware Installation and Software Configuration Guides

For detailed information about the Cisco CMTS platforms, see the following documents:

- *Cisco uBR7200 Series Universal Broadband Router Hardware Installation Guide*
- *Cisco uBR7200 Series Software Configuration Guide*
- *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide*
- *Cisco uBR10012 Universal Broadband Router Software Configuration Guide*
- *Cisco IOS CMTS Cable Software Configuration Guide*
- *Cisco Cable Modem Termination System Feature Guide*
- *Network Processing Engine and Network Services Engine Installation and Configuration*
- *Upgrading to the Cisco uBR7246 VXR Universal Broadband Router*

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.



Cable Commands: a through cable-modem

Revised: August 12, 2013, OL-15510-17

New Commands

Command	Cisco IOS Software Release
application-id	12.2(33)SCA

Obsolete Commands

Command	Effective Cisco IOS Release
activate-rule-at-byte-count	12.3(9a)BC
auto-sync	12.2(33)SCA

Replaced Commands

Command	Replacement Command	Effective Cisco IOS Release
annex modulation	rf-channel frequency	12.3(23)BC



access-denied

To create a DOCSIS configuration file that disables network access to the customer premise equipment (CPE) devices that are attached to the cable modem (CM) on a Cisco CMTS router, use the **access-denied** command in cable config-file configuration mode. To enable access, use the **no** form of this command.

access-denied

no access-denied

Syntax Description This command has no arguments or keywords.

Command Default Access to the cable network is permitted (**no access-denied**).

Command Modes Cable config-file configuration (config-file)

Command History	Release	Modification
	12.1(2)EC1	This command was introduced.
	12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.

Usage Guidelines This command sets the Network Access Control object in the DOCSIS configuration file. If the object is set to 1 (set by the default of **no access-denied**), the CPE devices behind the CM allow access to the network. If the object is set to 0 (by configuration of the **access-denied** command) to disable network access for the CPE devices, the CM does not forward traffic from its attached CPE devices.

For normal operation, the CM must be set to allow access (the default). However, to deny service for reasons such as nonpayment or unauthorized use of services, the **access-denied** command can be used.

Examples The following example shows how to disable network access for the CPE devices that are connected to the CM:

```
cable config-file disable.cm
access-denied
```

Related Commands	Command	Description
	cable config-file	Creates a DOCSIS configuration file and enters configuration file mode.
	channel-id	Specifies upstream channel ID.
	cpe max	Specifies customer premise equipment information.
	download	Specifies download information for the configuration file.

Command	Description
frequency	Specifies the downstream frequency.
option	Specifies vendor-specific information fields in a DOCSIS configuration file.
privacy	Specifies privacy options for baseline privacy images.
service-class	Specifies service class definitions for the configuration file.
snmp manager	Specifies Simple Network Management Protocol (SNMP) options.
timestamp	Enables time-stamp generation.

activate-rule at-byte-count



Note

Effective with Cisco IOS Release 12.3(9a)BC, the **activate-rule at-byte-count** command is not available in Cisco IOS software.

To specify the number of bytes that a subscriber can transmit during the monitoring period on a Cisco CMTS router, use the **activate-rule at-byte-count** command in enforce-rule configuration mode. To reset the rule to its default values, use the **no** form of this command.

activate-rule at-byte-count *kbytes* { **downstream** | **upstream** } [**enforce**]

no activate-rule at-byte-count *kbytes* { **downstream** | **upstream** } [**enforce**]

Syntax Description

<i>kbytes</i>	Maximum number of kilobytes that the subscriber can transmit in the specified direction during the monitoring period. The valid range is 1 to 4294967, with a default of 0 (no limit). Note To reset the kilobyte count to 0, use the no form of this command.
downstream	Specifies that the kilobyte count applies to traffic in the downstream direction.
upstream	Specifies that the kilobyte count applies to traffic in the upstream direction. The default value is upstream .
enforce	(Optional) Specifies that the enforce-rule QoS profile should be applied automatically if a user violates the registered QoS profile. Note You must have previously configured a registered QoS profile, using the qos-profile registered command, before being able to use the enforce keyword.

Command Default

The *kbytes* value defaults to 0 (no limit), upstream direction, and enforce-rule QoS profiles are not automatically applied (**no activate-rule at-byte-count enforce**).

Command Modes

Enforce-rule configuration (enforce-rule)

Command History

Release	Modification
12.2(15)BC1	This command was introduced.
12.3(9a)BC	This command was removed.

Usage Guidelines

The **activate-rule at-byte-count** command specifies the maximum number of bytes that a subscriber can transmit during the monitor window period (see the **monitoring-duration** command). If a subscriber transmits traffic beyond this maximum value, the CMTS router considers the subscriber to be overconsuming.

If the optional **enforce** keyword has been specified for an enforce-rule, the CMTS router automatically switches overconsuming subscribers to the enforced QoS profile (see the **qos-profile enforced** command). The enforced QoS profile remains in force during the penalty time period (see the **qos-profile registered** command).

An enforce-rule can be created for only one direction, either upstream or downstream. To activate subscriber traffic management for both the upstream and downstream directions, create two different enforce-rules, with one rule's **activate-rule-at-byte-count** command specifying the downstream direction and the other rule specifying the upstream direction.

When you change the configuration of a currently active enforce-rule, that rule begins using the new configuration immediately to manage the cable modems tracked by the enforce-rule.

**Note**

You can create an enforce-rule that is a duplicate of an existing enforce-rule, but the duplicate rule is not activated and applied to service flows until at least one of its parameters is changed so that it has a unique configuration.

Examples

The following example shows a typical **activate-rule-at-byte-count** command for the downstream direction:

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# activate-rule at-byte-count 20 downstream
```

The following example shows a typical **activate-rule-at-byte-count** command for the upstream direction. The **enforce** option is also added so that the enforce-rule QoS profile is automatically applied to users who exceed their registered profile:

```
Router# configure terminal
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# activate-rule at-byte-count 5 upstream enforce
```

The following example shows the same command being given for a second enforce-rule. The system rejects the command because it is a duplicate of an existing rule, using the same QoS profile and direction. You must change at least one of the rule parameters to make it unique before it is mapped and applied to service flows.

```
Router# configure terminal
Router(config)# cable qos enforce-rule test2
Router(enforce-rule)# activate-rule at-byte-count 5 upstream enforce
```

Enforce-rule test2 won't be mapped to service flows as it is duplicate of test1 with same registered qos-profile 5 and same direction

Related Commands

Command	Description
cable qos enforce-rule	Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode.
enabled (enforce-rule)	Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.
duration	Specifies the time period and sample rate to be used for monitoring subscribers.

Command	Description
penalty-period	Specifies the time period that an enforced QoS profile should be in effect for subscribers that violate their registered QoS profiles.
qos-profile enforced	Specifies a QoS profile that should be enforced when users violate their registered QoS profiles.
qos-profile registered	Specifies the registered QoS profile that should be used for this enforce-rule.
show cable qos enforce-rule	Displays the QoS enforce-rules that are currently defined.
show cable subscriber-usage	Displays subscribers who are violating their registered QoS profiles.

annex modulation



Note

Effective with Cisco IOS Release 12.3(23)BC, the **annex modulation** command is obsolete and **annex** and **modulation** are included as keyword options in the **rf-channel frequency** command.

To set the annex (MPEG framing format) and modulation for the Wideband SPA, use the **annex modulation** command in controller configuration mode. To set the annex to B and the modulation to 64 QAM, use the **no** form of this command.

annex {A | B} modulation {64qam | 256qam} [*rf-start-index rf-end-index*]

no annex {A | B} modulation {64qam | 256qam} [*rf-start-index rf-end-index*]

Syntax Description

{A B}	Specifies the MPEG framing format: A—Annex A. The downstream is compatible with the European MPEG framing format specified in ITU-TJ.83 Annex A. B—Annex B. The downstream is compatible with the North American MPEG framing format specified in ITU-TJ.83 Annex B.
{64qam 256qam}	Specifies the modulation rate: 64qam—64-QAM modulation. 256qam—256-QAM modulation.
<i>rf-start-index</i> <i>rf-end-index</i>	(Optional) Specifies the start and end indexes for RF channels. The following values are allowed: - If the annex is A and the modulation is 256 QAM, <i>rf-start-index</i> must be 0, and <i>rf-end-index</i> must be 17. - For all other cases, <i>rf-start-index</i> must be 0, and <i>rf-end-index</i> must be 23.

Command Default

No annex or modulation is set for the Wideband SPA.

Command Modes

Controller configuration

Command History

Release	Modification
12.3(21)BC	This command was introduced for the Cisco uBR10012 router.
12.3(23)BC	This command was made obsolete and annex and modulation were included as keyword options in the rf-channel frequency command.

Usage Guidelines

Use this command to set the following on a Wideband SPA:

- Annex (MPEG framing format)
- Modulation

- Start and end indexes for RF channels

Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command.

- For annex A and 256 QAM modulator, each Wideband SPA supports 18 RF channels.
- For all other cases, each Wideband SPA supports 24 RF channels.

The *rf-start-index* and *rf-end-index* arguments are intended for future use and are not currently needed. If *rf-start-index* and *rf-end-index* are not specified, the default values are as follows:

- If the annex is A and the modulation is 256 QAM, *rf-start-index* is 0, and *rf-end-index* is 17.
- For all other cases, *rf-start-index* is 0, and *rf-end-index* is 23.

Examples

The following example shows how to set the MPEG framing format and modulation for the Wideband SPA located at slot 1, subslot 0, bay 0:

```
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# annex B modulation 64qam
```

Related Commands

Command	Description
cable rf-channel	Associates an RF channel on a Wideband SPA with a wideband channel.
controller modular-cable	Enters controller configuration mode to configure the Wideband SPA controller.
ip-address (controller)	Sets the IP address of the Wideband SPA FPGA.
modular-host subslot	Specifies the modular-host line card.
rf-channel frequency	Sets the frequency for each RF channel.
rf-channel ip-address mac-address udp-port	Sets the IP address, MAC address and UDP port for each RF channel.
rf-channel network delay	Specifies the CIN delay for each RF channel.
rf-channel description	Specifies the description for each RF channel.
rf-channel cable downstream channel-id	Assigns a downstream channel ID to an RF channel.

application-id

To specify an application type to allow admission control to be applied to a group configuration, use the **application-id** command in multicast QoS configuration mode. To disable admission control, use the **no** form of this command.

application-id *number*

no application-id *number*

Syntax Description

<i>number</i>	Specifies the application identification number of the multicast QoS group. The valid range is 1–65535.

Command Default

Multicast QoS group application type is not identified.

Command Modes

Multicast QoS configuration (config-mqos)

Command History

Release	Modification
12.2(33)SCA	This command was introduced.

Usage Guidelines

In order to enable intelligent multicast admission control, you must enable and configure an application type using the **application-id** command.

Examples

The following example identifies a multicast QoS group application ID using the **applicaton-id** command:

```
Router(config)# cable multicast qos group 20 priority 55 global
Router(config-mqos)# application-id 44
```

Related Commands

Command	Description
cable multicast qos group	Specifies and configures a cable multicast QoS group.
show interface bundle multicast-sessions	Displays multicast session information for a specific virtual cable bundle.
show interface cable multicast-sessions	Displays multicast session information for a specific cable interface.

attributes

To configure the attribute value for an upstream bonding group, use the **attributes** command in upstream bonding configuration submode. To restore the default attribute value, use the **no** form of this command.

attributes *value*

no attributes

Syntax Description

<i>value</i>	The upstream bonding group attribute value, in hexadecimal format. The range is from 0 to FFFFFFFF. The default is 80000000.

Command Default

The upstream bonding group attribute value is 80000000.

Command Modes

Upstream bonding configuration (config-upstream-bonding)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.

Usage Guidelines



Note

Effective with Cisco IOS Release 12.2(33)SCH, the **no** form of this command disables the attribute on a Cisco uBR10012 router.

Examples

The following example shows how to configure the attribute value for an upstream bonding group on a cable interface line card on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable7/1/0
Router(config-if)# cable upstream bonding-group 20
Router(config-upstream-bonding)# attributes eeeeeeee
```

Related Commands

Command	Description
cable upstream bonding-group	Creates an upstream bonding group on a cable interface.

auto-sync

To enable automatic synchronization of the configuration files in NVRAM, use the **auto-sync** command in main-cpu redundancy configuration mode. To disable automatic synchronization, use the **no** form of this command.

auto-sync { **startup-config** | **config-register** | **bootvar** | **running-config** | **standard** }

no auto-sync { **startup-config** | **config-register** | **bootvar** | **standard** }

Syntax Description

startup-config	Specifies synchronization of the startup configuration files.
config-register	Specifies synchronization of the configuration register values.
bootvar	Specifies synchronization of the following boot variables: • BOOT—Set by the boot system device:filename command. • CONFIG_FILE—Set by the boot config device:filename command. • BOOTLDR—Set by the boot bootldr device:filename command.
running-config	Specifies synchronization of the running configuration files.
standard	Specifies synchronization of all of the system files (startup configuration, boot variables, and config configuration registers).

Defaults

For the Performance Routing Engines (PREs) on the Cisco uBR10012 universal broadband router, the system defaults to synchronizing all system files on the (**auto-sync standard**).

For the Supervisor Engines on the Cisco 7600 series routers, the system defaults to synchronizing the running configuration. (**running-config**).

Command Modes

Redundancy configuration (config-r)

Command History

Release	Modification
12.2(4)XF1	This command was introduced on the Cisco uBR10012 universal broadband router.
12.2(14)SX	This command was integrated into the Supervisor Engine 720.
12.2(17d)SXB	Support was added for the Supervisor Engine 2.
12.2(18)SXD	Support for this command on the Cisco 7600 series routers was removed.
12.3BC	This command was integrated into Cisco IOS Release 12.3BC for the Cisco uBR10012 router.
12.2(33)SCA	This command is obsolete on the Cisco uBR10012 universal broadband router.

Usage Guidelines

Cisco 7600 Series Routers

If you enter the **no auto-sync standard** command, no automatic synchronizations occur. If you want to enable any of the keywords, you have to enter the appropriate command for each keyword.

The **auto-sync** command is not supported in RPR+ mode.

Cisco uBR10012 Universal Broadband Router

By default, the system synchronizes all system files, which is the typical setting for most applications. However, you might want exclude certain files from synchronization for specialized applications.

For example, if you have configured the active and standby PRE1 (or PRE2) modules to run different versions of Cisco IOS software, you might want to use different configuration files as well. In this case, you would not synchronize the startup configuration file.

Examples

Cisco 7600 Series Routers

The following example shows how (from the default configuration) to enable automatic synchronization of the configuration register in the main CPU:

```
Router# configure terminal
Router (config)# redundancy
Router (config-r)# main-cpu
Router (config-r-mc)# no auto-sync standard
Router (config-r-mc)# auto-sync config-register
```

Cisco uBR10012 Universal Broadband Router

The following example shows the system being configured to synchronize only the startup configuration file:

```
router(config)# redundancy
router(config-r)# main-cpu
router(config-r-mc)# auto-sync startup-config
router(config-r-mc)# exit
router(config-r)# exit
```

The following example shows how to configure the system to synchronize all system files except for the startup configuration file. This typically is done when the two PRE1 (or PRE2) modules are running different software images.

```
router(config)# redundancy
router(config-r)# main-cpu
router(config-r-mc)# no auto-sync startup-config
router(config-r-mc)# auto-sync config-register
router(config-r-mc)# auto-sync bootvar
router(config-r-mc)# exit
router(config-r)# exit
```

Related Commands

Command	Description
redundancy	Enters redundancy configuration mode.
main-cpu	Enters main CPU redundancy configuration mode.

cable-modem compliant bridge

To enable DOCSIS-compliant bridging for the cable interface at startup, use the **cable-modem compliant bridge** command in cable interface configuration mode. To disable DOCSIS-compliant bridging, which is required to enable routing mode, use the **no** form of this command.

Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

cable-modem compliant bridge

no cable-modem compliant bridge

Syntax Description This command has no arguments or keywords.

Command Default DOCSIS-compliant bridging is enabled by default.

Command Modes Interface configuration (cable interface only)

Command History	Release	Modification
	11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
	12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
	12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
	12.1(5)XU1	Support was added for the Cisco CVA122 Cable Voice Adapter.
	12.2(2)XA	Support was added for the Cisco uBR925 cable access router.

Usage Guidelines It is normally not necessary to enter this command in data-over-cable bridging applications because DOCSIS-compliant bridging is enabled by default. However, to configure the router for full transparent bridging or for routing mode, use the **no** form of the command and then configure the router as desired using the appropriate CLI commands.

Examples The following example shows how to disable DOCSIS-compliant bridging on the cable interface:

```
Router# configure terminal
Router(config)# interface cable-modem 0
Router(config-if)# no cable-modem compliant bridge
Router(config-if)#
```

Related Commands	Command	Description
	cable-modem downstream saved channel	Modifies the saved downstream channel setting and upstream power value on the cable interface.
	cable-modem fast-search	Enables a faster downstream search algorithm on the cable interface.
	cable-modem upstream preamble qpsk	Enables the QPSK modulation scheme in the upstream direction from the cable interface to the CMTS.
	cable-modem voip best-effort	Allows voice calls to be sent upstream over the cable interface via best effort.

cable-modem dhcp-proxy

To specify that a Dynamic Host Configuration Protocol (DHCP) server should provide an IP address for the router's Ethernet interface, for the loopback interface, or for the router's Network Address Translation (NAT) address pool, use the **cable-modem dhcp-proxy** command in cable interface configuration mode. To disable this feature so that you can then manually assign an IP address to the Ethernet interface or NAT address pool, use the **no** form of this command.

Cisco uBR905, Cisco uBR924, Cisco uBR925 Cable Access Routers, and Cisco CVA122 Cable Voice Adapter

```
cable-modem dhcp-proxy {interface ethernet number | interface loopback number |  
                        nat pool-name}
```

```
no cable-modem dhcp-proxy {interface ethernet number | interface loopback number |  
                        nat pool-name}
```



Note

This command is available only when the router is configured for routing mode and cannot be used when the router is configured for DOCSIS-compliant bridging.

Syntax Description

interface ethernet <i>number</i>	Identifies the Ethernet interface to be assigned the static IP address from the DHCP server (always 0).
interface loopback <i>number</i>	Identifies the loopback interface to be assigned the static IP address from the DHCP server (always 0).
nat <i>pool-name</i>	Specifies the name of the NAT pool to be created using the IP address and subnet mask supplied by the DHCP server. (This option is equivalent to giving the ip nat pool <i>pool-name start-ip end-ip netmask subnet</i> command, using the IP address and subnet mask supplied by the DHCP server.)

Command Default

No default behavior or values

Command Modes

Interface configuration (cable interface only)

Command History

Release	Modification
12.1(1)T	This command was introduced on the Cisco uBR924 cable access router.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU1	Support was added for the Cisco CVA122 Cable Voice Adapter.
12.2(2)XA	Support was added for the Cisco uBR925 cable access router.
12.2(8)YJ	The loopback option was added to support automatic configuration of the IP address on the cable modem tunnel interface for the Cisco uBR905 and Cisco uBR925 cable access routers.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.

Usage Guidelines

This command is useful in three situations:

- When the router is configured for routing mode, an IP address must be assigned to its Ethernet interface. Without the **cable-modem dhcp-proxy** command, this IP address must be a static IP address assigned either by using a Cisco IOS configuration file or by manually entering the necessary interface configuration CLI commands. The **cable-modem dhcp-proxy** command allows a DHCP server to assign an IP address to the Ethernet interface.
- When NAT is used, an inside global address pool must be created on the Ethernet interface. Without the **cable-modem dhcp-proxy** command, this must be done by specifying a static IP address in the **ip nat pool pool-name start-ip end-ip netmask subnet** command. The **cable-modem dhcp-proxy** command allows a DHCP server to assign an IP address that automatically creates the NAT address pool.

When using this option, you must also use the following NAT configuration commands:

- Use the **ip nat inside** command in interface configuration mode to configure the Ethernet interface as the inside interface.
- Use the **ip nat outside** command in interface configuration mode to configure the cable interface as the outside interface.
- Specify the **overload** option with the **ip nat** command in global configuration mode to implement Port Address Translation (PAT) so that multiple PCs can use the single IP address in the NAT pool created by the **cable-modem dhcp-proxy** command.
- When using the Cisco Easy VPN feature to create a VPN tunnel, the command allows a static address to be used for the tunnel's creation.

After configuring the router with the **cable-modem dhcp-proxy** command, reboot the router. During the DOCSIS provisioning process, the router sends a DHCP client request to obtain an IP address for the cable interface.

The router then sends a proxy DHCP request to the DHCP server using the Ethernet interface's MAC address. The DHCP server replies with a second IP address that the router assigns to either the Ethernet or loopback interface, or to the NAT pool, depending on which option was used in the **cable-modem dhcp-proxy** command.

**Note**

When replying to the proxy request for the Ethernet interface, the DHCP server should assign an IP address that is on the same network as the customer premises equipment (CPE) devices that are attached to the router's Ethernet interface.

**Tip**

If you have configured a Cisco CM for routing mode and are also using the **cable-modem dhcp-proxy nat** command on the CM, you must configure the corresponding cable interface on the Cisco CMTS with the **cable dhcp-giaddr policy** command.

Using NAT and DHCP Proxy and Copying Configuration Files

Most service providers typically create a standard configuration file for their cable modems, verify it, and then copy the working configuration as needed to other cable modems. This can cause problems when using the **cable-modem dhcp-proxy** command to create a NAT address pool for NAT/PAT translation.

The reason is that the default router configuration is for DOCSIS-compliant bridging, which includes two **bridge-group 59** commands for each interface. To use the **cable-modem dhcp-proxy** command, you must put the router into routing mode, which means removing the **bridge-group** commands with the equivalent **no bridge-group** commands.

However, because **no bridge-group** is the default for these CLI commands, they are not saved in the running configuration. So when you save the Cisco IOS configuration file and copy it to other routers, the router is only partially configured for routing mode and continually resets its interfaces.

In addition, whenever you use the **cable-modem dhcp-proxy** command to create a NAT pool, the router automatically adds the appropriate **ip nat pool** commands to the configuration when it receives the actual IP addresses from the DHCP server. The IP addresses specified in this command are particular to each user and should not be copied to other routers.

To avoid this problem, use the following procedure to create a Cisco IOS configuration file that uses the **cable-modem dhcp-proxy** command to create a NAT address pool for NAT/PAT address translation:

-
- Step 1** Create and test a working configuration on a cable access router.
- Step 2** After you have created a standardized configuration, save it to memory, and then copy the Cisco IOS configuration file to the TFTP server that will be used to copy the file to the other routers.
- Step 3** Open the Cisco IOS configuration file with a text editor and add the following lines underneath each interface:
- ```
no bridge-group 59
no bridge-group 59 spanning-disabled
```
- Step 4** Remove the **ip nat pool** command.
- 

For example, the following are the relevant lines in a typical DHCP proxy NAT configuration for a cable access router:

```
interface Ethernet0
 ip address 192.168.1.1 255.255.255.0
 ip nat inside
 load-interval 30
!
interface cable-modem0
 ip nat outside
 load-interval 30
 no cable-modem compliant bridge
 cable-modem dhcp-proxy nat nat-pool
!
ip nat pool nat-pool 10.15.0.10 10.15.0.10 netmask 255.255.0.0
```

When you copy this configuration file to the TFTP server, modify this portion of the configuration file to add the **no bridge-group** commands under each interface and to remove the **ip nat pool** command:

```
interface Ethernet0
 ip address 192.168.1.1 255.255.255.0
 ip nat inside
 load-interval 30
 no bridge-group 59
 no bridge-group 59 spanning-disabled
!
interface cable-modem0
 ip nat outside
 load-interval 30
 no cable-modem compliant bridge
```

```

cable-modem dhcp-proxy nat nat-pool
no bridge-group 59
no bridge-group 59 spanning-disabled
!

```

**Note**

Be sure to remove the **ip nat pool** command.

**Examples**

The following example shows how to configure the router so that it makes a proxy DHCP request to obtain an IP address for its Ethernet interface:

```

Router(config)# interface c0
Router(config-if)# cable-modem dhcp-proxy interface ethernet 0

```

The following example creates a NAT address pool with the IP address assigned by the DHCP server; this IP address must be in the network attached to the Ethernet address (which in this case is 192.168.100.0).

```

Router(config)# ip nat inside source list 1 pool net-208 overload
Router(config)# interface cable0
Router(config-if)# ip nat outside
Router(config-if)# no cable compliant bridge
Router(config-if)# cable-modem dhcp-proxy nat net-208
Router(config-if)# exit
Router(config)# interface ethernet0
Router(config-if)# ip address 192.168.100.94 255.255.255.0
Router(config-if)# ip nat inside
Router(config-if)# exit
Router(config)# access-list 1 permit 192.168.100.0 0.0.0.255
Router(config)#

```

**Related Commands**

| Command                             | Description                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------|
| <b>cable-modem compliant bridge</b> | Enables DOCSIS-compliant transparent bridging for the cable interface at startup. |

# cable-modem downstream saved channel

To modify the saved downstream channel setting and upstream power value on the cable interface, use the **cable-modem downstream saved channel** command in cable interface configuration mode. To remove the saved settings, which will be saved at the next initialization cycle, use the **no** form of this command.

**Cisco uBR904, uBR924 cable access routers**

**cable-modem downstream saved channel** *ds-frequency us-power*

**no cable-modem downstream saved channel** *ds-frequency us-power*



## Note

Cisco IOS Release 12.1(2)T removed this command from the CLI for all platforms and reserved it for exclusive use by the DOCSIS provisioning process.

## Syntax Description

|                     |                                                                                   |
|---------------------|-----------------------------------------------------------------------------------|
| <i>ds-frequency</i> | Downstream channel frequency in Hz, which can be from 91,000,000 to 860,000,000.  |
| <i>us-power</i>     | Upstream power level in decibels per millivolt (dBmV), which can be from 8 to 61. |

## Command Default

Enabled

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release    | Modification                                                                                                               |
|------------|----------------------------------------------------------------------------------------------------------------------------|
| 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router.                                                      |
| 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.                                                                |
| 12.1(2)T   | This command was removed from the CLI for all platforms and reserved for exclusive use by the DOCSIS provisioning process. |

## Usage Guidelines

This command is auto-generated by the operation of the cable MAC layer process. The DOCSIS RFI specification requires that CMs remember the downstream frequency and upstream power of the last successfully ranged session. These arguments are called up as the first downstream frequency and upstream power to use the next time the CM is booted. This operation dramatically speeds up the channel search.

Use the **no cable-modem downstream saved channel** *ds-frequency us-power* command to remove the saved frequency and power setting from the running configuration, which will be saved at the next initialization cycle.

To comply with DOCSIS requirements, Cisco IOS Release 12.1(2)T removed this command from the CLI for all platforms and reserved it for exclusive use by the DOCSIS provisioning process. This command exists in earlier Cisco IOS versions, but Cisco recommends that this command NOT be used by end users of Cisco cable CPE devices.

### Examples

The following example shows how to remove the downstream frequency of 91,000,000 Hz and the upstream power level of 33 dBmV from the running configuration of a cable-modem interface:

```
Router(config)# interface cable-modem 0
Router(config-if)# no cable-modem downstream saved channel 91000000 33
Router(config-if)#
```

### Related Commands

| Command                                   | Description                                                                                     |
|-------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>cable-modem compliant bridge</b>       | Enables DOCSIS-compliant transparent bridging for the cable interface at startup.               |
| <b>cable-modem fast-search</b>            | Enables a faster downstream search algorithm on the cable interface.                            |
| <b>cable-modem upstream preamble qpsk</b> | Enables the QPSK modulation scheme in the upstream direction from the CM interface to the CMTS. |
| <b>cable-modem voip best-effort</b>       | Allows voice calls to be sent upstream over the cable interface via best effort.                |



# cable-modem fast-search

To enable a faster downstream search algorithm on the cable interface, use the **cable-modem fast-search** command in cable interface configuration mode. To disable the downstream fast-search feature, use the **no** form of this command.

Cisco uBR904, uBR924 cable access routers

**cable-modem fast-search**

**no cable-modem fast-search**



## Note

Cisco IOS Release 12.1(2)T removed this command from the CLI for all platforms and reserved it for exclusive use by the DOCSIS provisioning process.

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                        |          |
|------------------------|----------|
| <b>Command Default</b> | Disabled |
|------------------------|----------|

|                      |                                                |
|----------------------|------------------------------------------------|
| <b>Command Modes</b> | Interface configuration (cable interface only) |
|----------------------|------------------------------------------------|

| Command History | Release    | Modification                                                                                                               |
|-----------------|------------|----------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router.                                                      |
|                 | 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.                                                                |
|                 | 12.1(2)T   | This command was removed from the CLI for all platforms and reserved for exclusive use by the DOCSIS provisioning process. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This feature speeds up the frequency search performed by the cable access router. Normally it takes the cable access router about 30 to 50 seconds to sample 30 to 50 frequencies. The <b>cable-modem fast-search</b> command can reduce this search time. However, there might be some cases where this fast-search algorithm might not perform as well as the default algorithm. Trial and error is the only way to discover how well this feature works for your environment. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                   |
|-----------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable the faster downstream search algorithm on the router's cable interface: |
|-----------------|-------------------------------------------------------------------------------------------------------------------|

```
Router(config)# interface cable-modem 0
Router(config-if)# cable-modem fast-search
Router(config-if)#
```

| Related Commands | Command                                     | Description                                                                                        |
|------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------|
|                  | <b>cable-modem compliant bridge</b>         | Enables DOCSIS-compliant transparent bridging for the cable interface at startup.                  |
|                  | <b>cable-modem downstream saved channel</b> | Modifies the saved downstream channel setting and upstream power value on the cable interface.     |
|                  | <b>cable-modem upstream preamble qpsk</b>   | Enables the QPSK modulation scheme in the upstream direction from the cable interface to the CMTS. |
|                  | <b>cable-modem voip best-effort</b>         | Allows voice calls to be sent upstream over the cable interface via best effort.                   |

# cable-modem qos drop-ack

To enable the automatic dropping of unnecessary TCP packet acknowledgements on the cable interface, use the **cable-modem qos drop-ack** command in cable interface configuration mode. To disable this feature, so that all TCP packet acknowledgements are sent, use the **no** form of this command.

**Cisco uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**cable-modem qos drop-ack**

**no cable-modem qos drop-ack**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Enabled

## Command Modes

Interface configuration and subinterface configuration (cable interface only)

## Command History

| Release    | Modification                                                                                               |
|------------|------------------------------------------------------------------------------------------------------------|
| 12.2(2)XA4 | This command was introduced for the Cisco uBR905 cable access router and Cisco CVA122 Cable Voice Adapter. |
| 12.2(7)    | Support was added for the Cisco uBR924 cable access router.                                                |
| 12.2(8)T   | Support was added for the Cisco uBR925 cable access router.                                                |

## Usage Guidelines

TCP traffic uses a packet-acknowledge algorithm, where a group of packets must be acknowledged before additional traffic can be sent. When a large number of packets is transmitted on the downstream, it can result in a large number of acknowledgements on the upstream. Because the downstream bandwidth is typically many times greater than the upstream bandwidth, certain applications can temporarily overrun the upstream with a large volume of acknowledgement packets.

If any of those acknowledgements are dropped or lost, traffic can be backed up, and data packets might have to be resent, even if those packets had in fact been successfully received. This can significantly impact real-time traffic, such as voice calls.

To optimize the TCP traffic on the upstream in these circumstances, the Cisco uBR905, Cisco uBR924, and Cisco uBR925 cable access routers and the Cisco CVA122 Cable Voice Adapters automatically analyze the upstream traffic and drop unnecessary packet acknowledgements when traffic begins backing up. This feature has been automatically enabled by default on the routers, starting with Cisco IOS Release 12.0(5)T.

In some situations, however, this feature can result in packets being dropped on the upstream, which could impact the performance of certain applications such as FTP transfers. If packet drops do occur on the upstream, this feature can be turned off with the **no cable-modem qos drop-ack** command.

---

**Examples**

The following example shows how to disable the TCP packet optimization feature on the cable interface, so that all TCP packet acknowledgements are sent:

```
Router(config)# interface cable-modem 0
Router(config-if)# no cable-modem qos drop-ack
Router(config-if)#
```

The following example shows how to enable the TCP packet optimization feature on the cable interface. This is the default configuration, so it does not need to be done unless it has been previously disabled.

```
Router(config)# interface cable-modem 0
Router(config-if)# cable-modem qos drop-ack
Router(config-if)#
```

---

**Related Commands**

| Command                                 | Description                                                                     |
|-----------------------------------------|---------------------------------------------------------------------------------|
| <b>show controllers cable-modem qos</b> | Displays detailed information about the Quality of Service (QoS) configuration. |

# cable-modem upstream preamble qpsk

To enable the QPSK modulation scheme in the upstream direction from the cable interface to the CMTS, use the **cable-modem upstream preamble qpsk** command in cable interface configuration mode. To disable upstream modulation for the interface, use the **no** form of this command.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**cable-modem upstream preamble qpsk**

**no cable-modem upstream preamble qpsk**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Enabled

**Command Modes** Interface configuration (cable interface only)

| Command History | Release    | Modification                                                          |
|-----------------|------------|-----------------------------------------------------------------------|
|                 | 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router. |
|                 | 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.           |
|                 | 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.           |
|                 | 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                 | 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.           |

**Examples** The following example shows how to configure the cable interface for QPSK modulation on the upstream:

```
Router(config)# interface cable-modem 0
Router(config-if)# cable-modem upstream preamble qpsk
Router(config-if)#
```

| Related Commands | Command                                     | Description                                                                                    |
|------------------|---------------------------------------------|------------------------------------------------------------------------------------------------|
|                  | <b>cable-modem compliant bridge</b>         | Enables DOCSIS-compliant transparent bridging for the cable interface at startup.              |
|                  | <b>cable-modem downstream saved channel</b> | Modifies the saved downstream channel setting and upstream power value on the cable interface. |
|                  | <b>cable-modem fast-search</b>              | Enables a faster downstream search algorithm on the cable interface.                           |
|                  | <b>cable-modem voip best-effort</b>         | Allows voice calls to be sent upstream over the cable interface via best effort.               |

# cable-modem voip best-effort

To allow voice calls to be sent upstream over the cable interface using best-effort quality of service (QoS), use the **cable-modem voip best-effort** command in cable interface configuration mode. To disable best-effort voice calls, use the **no** form of this command.

**Cisco uBR924 cable access router**

**cable-modem voip best-effort**

**no cable-modem voip best-effort**



## Note

Cisco IOS Release 12.1(2)T removed this command from the CLI for all platforms and reserved it for exclusive use by the DOCSIS provisioning process.

## Syntax Description

This command has no arguments or keywords.

## Command Default

Enabled

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release    | Modification                                                                                                               |
|------------|----------------------------------------------------------------------------------------------------------------------------|
| 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router.                                                      |
| 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.                                                                |
| 12.1(2)T   | This command was removed from the CLI for all platforms and reserved for exclusive use by the DOCSIS provisioning process. |

## Usage Guidelines

This command allows you to configure the voice traffic on a router to allow only calls having a high-priority service identifier (SID) to be connected.

If the dynamic configuration of high-priority queues for voice traffic fails, or if the far end cannot support the multiple SIDs and multiple classes of service required by high-priority traffic, the flag set by this command will be checked. If enabled (the default setting), the call will be allowed to go through. If disabled, the call will fail.

## Examples

The following example shows how to disable best-effort voice calls:

```
Router(config)# interface cable-modem 0
Router(config-if)# no cable-modem voip best-effort
Router(config-if)#
```

**Related Commands**

| <b>Command</b>                              | <b>Description</b>                                                                                 |
|---------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>cable-modem compliant bridge</b>         | Enables DOCSIS-compliant transparent bridging for the cable interface at startup.                  |
| <b>cable-modem downstream saved channel</b> | Modifies the saved downstream channel setting and upstream power value on the cable interface.     |
| <b>cable-modem fast-search</b>              | Enables a faster downstream search algorithm on the cable interface.                               |
| <b>cable-modem upstream preamble qpsk</b>   | Enables the QPSK modulation scheme in the upstream direction from the cable interface to the CMTS. |

# cable-modem voip clock-internal

To enable the router's internal clock for Voice-over-IP (VoIP) calls, use the **cable-modem voip clock-internal** command in cable interface configuration mode. To disable the internal clock, so that it uses the clock from the cable interface for VoIP calls, use the **no** form of this command.

**Cisco uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**cable-modem voip clock-internal**

**no cable-modem voip clock-internal**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The default is to use the clock from the cable interface for VoIP calls.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release    | Modification                                                          |
|------------|-----------------------------------------------------------------------|
| 12.1(4)T   | This command was introduced for the Cisco uBR924 cable access router. |
| 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
| 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.           |

## Usage Guidelines

This command enables the internal clock, allowing it to make VoIP calls over the Ethernet and USB interfaces even when the cable interface is down or disconnected. If the CMTS is a Cisco uBR7200 series with a Cable Clock Card, this command disables the use of that clock.

This command can be used in both DOCSIS IP bridging and routing mode. However, when operating in DOCSIS IP bridging mode, VoIP packets are transmitted out only on the cable interface, so the router must be operating in routing mode to transmit voice packets out the Ethernet and USB interfaces.

## Examples

The following example shows how to enable the internal clock for VoIP calls:

```
Router(config)# interface cable0
Router(config-if)# cable-modem voip clock-internal
Router(config-if)#
```

## Related Commands

| Command                                     | Description                                                                                    |
|---------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>cable-modem compliant bridge</b>         | Enables DOCSIS-compliant transparent bridging for the cable interface at startup.              |
| <b>cable-modem downstream saved channel</b> | Modifies the saved downstream channel setting and upstream power value on the cable interface. |



| Command                                   | Description                                                                                        |
|-------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>cable-modem fast-search</b>            | Enables a faster downstream search algorithm on the cable interface.                               |
| <b>cable-modem upstream preamble qpsk</b> | Enables the QPSK modulation scheme in the upstream direction from the cable interface to the CMTS. |

■ cable-modem voip clock-internal



## Cable Commands: cable a through cable c

Revised: August 12, 2013, OL-15510-17

### New Commands

| Command                                           | Cisco IOS Software Release |
|---------------------------------------------------|----------------------------|
| cable clock dti                                   | 12.3(23)BC                 |
| cable clock dti clear-counters                    | 12.3(23)BC                 |
| cable bundle                                      | 12.2(33)SCA                |
| cable attribute-mask                              | 12.2(33)SCB                |
| cable cm-status                                   | 12.2(33)SCB                |
| cable cm-status enable                            | 12.2(33)SCB                |
| cable admission-control<br>max-reserved-bandwidth | 12.2(33)SCC                |
| cable clock upgrade                               | 12.2(33)SCC                |
| cable bonding-group-secondary                     | 12.2(33)SCE                |
| cable acfe enable                                 | 12.2(33)SCF                |
| cable acfe max-bonus-bandwidth                    | 12.2(33)SCF                |
| cable acfe max-eir-ratio                          | 12.2(33)SCF                |
| cable bgsync                                      | 12.2(33)SCG                |
| cable bgsync active                               | 12.2(33)SCG                |

### Modified Commands

| Command                        | Cisco IOS Software Release |
|--------------------------------|----------------------------|
| cable application-type include | 12.2(33)SCA                |
| cable clock clear-counters     | 12.3(23)BC                 |



| Command                                     | Cisco IOS Software Release |
|---------------------------------------------|----------------------------|
| <b>cable admission-control ds-bandwidth</b> | 12.2(33)SCC                |
| <b>cable admission-control us-bandwidth</b> | 12.2(33)SCC                |

# cable acfe enable

To enable Fairness Across DOCSIS Interfaces feature on the integrated-cable (IC), modular-cable (MC), or wideband-cable (WB) interfaces, use the **cable acfe enable** command in global configuration mode. To disable Fairness Across DOCSIS Interfaces feature, use the **no** form of this command.

**cable acfe enable**

**no cable acfe enable**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Fairness Across DOCSIS Interfaces feature is disabled.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCF | This command was introduced. |

## Usage Guidelines

Configure the Fairness Across DOCSIS Interfaces feature on the MC, IC, or WB interfaces.

It is recommended that you clear the CIR reservation above the legacy “reservable” bandwidth before disabling Fairness Across DOCSIS Interfaces feature. This is to prevent any CIR over-subscription after disabling Fairness Across DOCSIS Interfaces feature.

## Examples

The following example shows how to enable Fairness Across DOCSIS Interfaces feature in cable interfaces.

```
Router(config)# cable acfe enable
```

## Related Commands

| Command                        | Description                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------|
| <b>cable acfe period</b>       | Configures the interval for running the EIR rebalancing process.                    |
| <b>show cable acfe summary</b> | Displays Fairness Across DOCSIS Interfaces feature status and statistics.           |
| <b>debug cable acfe</b>        | Displays the debug information related to algorithm or interaction with the system. |

# cable acfe max-bonus-bandwidth

To configure the maximum usable bonus bandwidth for a bonding group (BG), use the **cable acfe max-bonus-bandwidth** command in interface configuration mode. To revert to the default values, use the **no** form of this command.

**cable acfe max-bonus-bandwidth** *bonus-bandwidth*

**no cable acfe max-bonus-bandwidth**

## Syntax Description

|                        |                                                                                                                                         |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <i>bonus-bandwidth</i> | Maximum usable bonus bandwidth for a BG. There is no valid range, and the bonus bandwidth can use the entire bandwidth of an interface. |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

The bonus bandwidth can use the entire bandwidth of an interface.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCF | This command was introduced. |

## Usage Guidelines

The **cable acfe max-bonus-bandwidth** command configures the maximum usable bonus bandwidth. After disabling Fairness Across DOCSIS Interfaces feature, this configuration is retained. However, it will not be used.

## Examples

The following example shows how to configure the maximum usable bonus bandwidth for a BG:

```
Router(config-if)# cable acfe max-bonus-bandwidth 1000000
```

## Related Commands

| Command                  | Description                                                                         |
|--------------------------|-------------------------------------------------------------------------------------|
| <b>cable acfe enable</b> | Enables Fairness Across DOCSIS Interfaces feature on the CMTS routers.              |
| <b>debug cable acfe</b>  | Displays the debug information related to algorithm or interaction with the system. |

# cable acfe max-eir-ratio

To configure the maximum EIR ratio between the BE bandwidth among adjacent bonding groups (BGs), use the **cable acfe max-eir-ratio** command in global configuration mode. To return to the default values, use the **no** form of this command.

**cable acfe max-eir-ratio** *eir-ratio*

**no cable acfe max-eir-ratio**

|                           |                  |                                                                                                            |
|---------------------------|------------------|------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>eir-ratio</i> | EIR rebalance ratio between two adjacent BGs. The valid range is from 1 to 100 with a default value of 10. |
|---------------------------|------------------|------------------------------------------------------------------------------------------------------------|

|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Command Default</b> | The default value for EIR rebalance ratio is 10. |
|------------------------|--------------------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| <b>Command History</b> | Release     | Modification                 |
|------------------------|-------------|------------------------------|
|                        | 12.2(33)SCF | This command was introduced. |

|                         |                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>cable acfe max-eir-ratio</b> command configures the maximum EIR ratio between the BE bandwidth among adjacent BGs.                                           |
|                         | The failure to maintain the maximum EIR ratio may reduce the guaranteed bandwidth rate for the BE traffic to zero. This may lead to rejection of unicast CIR flows. |

|                 |                                                                                                |
|-----------------|------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to configure the EIR rebalance ratio between two adjacent BGs: |
|                 | Router(config)# <b>cable acfe max-eir-ratio 20</b>                                             |

| <b>Related Commands</b> | Command                  | Description                                                                         |
|-------------------------|--------------------------|-------------------------------------------------------------------------------------|
|                         | <b>cable acfe enable</b> | Enables Fairness Across DOCSIS Interfaces feature on the CMTS router.               |
|                         | <b>debug cable acfe</b>  | Displays the debug information related to algorithm or interaction with the system. |

# cable admission-control

To configure the CPU and memory thresholds for a Cisco CMTS router supporting broadband processing engines (BPEs), use the **cable admission-control** command in global configuration mode. This command sets the CPU averaging method and memory thresholds. To remove thresholds from a Cisco CMTS router, use the **no** form of this command.

```
cable admission-control { cpu-5sec | cpu-avg } { [io-mem] [proc-mem] [total-memory] } minor
num1 major num2 critical num3
```

```
no cable admission control { cpu-5sec | cpu-avg } { [io-mem] [proc-mem] [total-memory] }
minor num1 major num2 critical num3
```

| Syntax Description   |  |                                                                                                                                                                                                                                             |
|----------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cpu-5sec</b>      |  | This keyword sets Admission Control thresholds on the Cisco CMTS based on a five-second average for the CPU. This setting must be combined with the additional <b>minor</b> , <b>major</b> and <b>critical</b> threshold percentage values. |
| <b>cpu-avg</b>       |  | This keyword sets Admission Control thresholds on the Cisco CMTS based on a one-minute average for the CPU. This setting must be combined with the additional <b>minor</b> , <b>major</b> and <b>critical</b> threshold percentage values.  |
| <b>io-mem</b>        |  | This keyword sets Admission Control thresholds for input/output (IO) memory on the Cisco CMTS route processors and BPE processors.                                                                                                          |
| <b>proc-mem</b>      |  | This keyword sets Admission Control thresholds according to CPU processor memory on the Cisco CMTS.                                                                                                                                         |
| <b>total-memory</b>  |  | This keyword sets Admission Control thresholds on the Cisco CMTS according to total-memory allocation.                                                                                                                                      |
| <b>minor</b> num1    |  | Keyword sets the minor threshold level for the CPU or memory resource to be configured. <i>Num1</i> expresses a percentage and must be an integer between 1 and 100.                                                                        |
| <b>major</b> num2    |  | Keyword sets the major threshold level for the CPU or memory resource to be configured. <i>Num2</i> expresses a percentage and must be an integer between 1 and 100.                                                                        |
| <b>critical</b> num3 |  | Keyword sets the critical threshold level for the CPU or memory resource to be configured. <i>Num3</i> expresses a percentage and must be an integer between 1 and 100.                                                                     |

|                        |                                                                                                                       |
|------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | By default, admission control is disabled with no CPU or memory resource threshold settings on the Cisco CMTS router. |
|------------------------|-----------------------------------------------------------------------------------------------------------------------|

|                      |                           |
|----------------------|---------------------------|
| <b>Command Modes</b> | Global configuration mode |
|----------------------|---------------------------|

| Command History | Release     | Modification                                                                                                                                                                                           |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced on the Cisco uBR10012 router and the Cisco uBR7246VXR router, with supporting broadband processing engines (BPEs) or cable interface line cards on the respective routers. |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                     |



**Usage Guidelines**

The threshold counters are set to zero when the resource is reconfigured.

An important concept for system resources that are set with this command (CPU and memory) is the concept of *dampening*. Without dampening, and when admission control is configured for the first time, the system resource check is unsuccessful if the current value exceeds the critical threshold. When this happens, the system resource check subsequently succeeds only if the current value drops below the major threshold.

**Note**

When the **minor** threshold value set with *Num1* or a major threshold value set with *Num2* is crossed, the Cisco CMTS router sends an alarm (SNMP trap, when supported). When the **critical** threshold value set with *Num3* is crossed, the Cisco CMTS router drops the call request.

This dampening approach helps prevent significant fluctuations in the outcome of resource checks. For example, if the critical threshold were 80 percent and the current values fluctuated between 79 and 81 percent, this scenario would lead to an alternate success then failure event without dampening. The first check would succeed, the second check would fail, and so forth.

For additional Admission Control feature information, refer to the *Admission Control for the Cisco Cable Modem Termination System* document on Cisco.com.

**Examples**

The following example configures the Cisco CMTS router with a Quality of Service (QoS) policy that includes admission control dampening. This example illustrates the following conditions:

- When the **cpu-avg** exceeds 60%, a minor alarm (SNMP trap, when supported) is sent.
- When the **cpu-avg** exceeds 70%, a major alarm (SNMP trap, when supported) is sent.
- When the **cpu-avg** exceeds 80%, the incoming call request is rejected, and additional calls are not accepted until after the **cpu-avg** returns to below 60% (the minor alarm level).

```
Router(config)# cable admission-control cpu-avg minor 60 major 70 critical 80
```

**Related Commands**

| Command                                       | Description                                                                                                            |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>cable admission-control event</b>          | Configures and enables admission control event types on the Cisco CMTS router.                                         |
| <b>cable admission-control ds-bandwidth</b>   | Configures admission control downstream bandwidth thresholds on the Cisco CMTS router.                                 |
| <b>cable admission-control us-bandwidth</b>   | Configures admission control upstream bandwidth thresholds on the Cisco CMTS router.                                   |
| <b>clear cable admission control counters</b> | Clears all admission control resource counters on the Cisco CMTS router.                                               |
| <b>debug cable admission-control</b>          | Enables automatic admission control troubleshooting processes on the Cisco CMTS router.                                |
| <b>show cable admission-control</b>           | Displays the current admission control configuration and status on the Cisco CMTS router, or on a specified interface. |

# cable admission-control ds-bandwidth

To set the minor, major, and exclusive thresholds for downstream voice or data bandwidth for all interfaces on a Cisco CMTS router, use the **cable admission-control ds-bandwidth** command in global configuration mode or interface configuration mode. To remove this setting from a Cisco CMTS router or from a specified interface, use the **no** form of this command.

**cable admission-control ds-bandwidth** *traffic-type* **minor** *minor-threshold* **major** *major-threshold*  
**exclusive** *exclusive-percentage* **non-exclusive** *non-exclusive-percentage*

**no cable admission-control ds-bandwidth** *traffic-type* **minor** *minor-threshold* **major**  
*major-threshold* **exclusive** *exclusive-percentage* **non-exclusive** *non-exclusive-percentage*

| Syntax Description                                   |  |                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ds-bandwidth</b>                                  |  | Sets downstream throughput thresholds.                                                                                                                                                                                                                                                                                         |
| <i>traffic-type</i>                                  |  | Either of the following keywords sets the traffic type for which Admission Control applies. Both settings can be applied to the Cisco CMTS. <ul style="list-style-type: none"> <li><b>voice</b>—Applies thresholds to downstream voice traffic.</li> <li><b>data</b>—Applies thresholds to downstream data traffic.</li> </ul> |
| <b>minor</b> <i>minor-threshold</i>                  |  | Sets the minor alarm threshold. The <i>minor-threshold</i> value is a percentage value from 1 to 100.                                                                                                                                                                                                                          |
| <b>major</b> <i>major-threshold</i>                  |  | Sets the major alarm threshold. The <i>major-threshold</i> value is a percentage value from 1 to 100.                                                                                                                                                                                                                          |
| <b>exclusive</b> <i>exclusive-percentage</i>         |  | Specifies the percentage of throughput reserved exclusively for this class (voice or data). The <i>exclusive-percentage</i> value is an integer between 1 and 100. No other class can use this throughput.                                                                                                                     |
| <b>non-exclusive</b> <i>non-exclusive-percentage</i> |  | Specifies the percentage of throughput, over and above the exclusive share, that can be used by this class. The <i>non-exclusive-percentage</i> value is an integer between 1 and 100. Because this throughput is non-exclusive, it can be used by other classes as specified.                                                 |

**Command Default** Admission control is disabled by default on the Cisco CMTS router.

**Command Modes** Global configuration (config)  
Interface configuration (config-if)

**Command History**

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced on the Cisco uBR10012 and the Cisco uBR7246VXR router.                                 |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCC | This command was modified to run on modular cable and integrated cable interfaces.                                 |

**Usage Guidelines**

Downstream bandwidth settings support all interfaces on the Cisco CMTS router through global configuration.

Downstream bandwidth settings can be further refined per-interface or per-upstream, the latter of which provides optimal downstream Admission Control granularity on the Cisco CMTS router.

When interface-level downstream configuration is used in combination with global configuration, then the interface configuration supersedes global configuration.

**Note**

The **critical** keyword is not present for the upstream throughput resource management with the Cisco Service Flow Admission Control feature.

**Note**

The **minor** threshold level cannot be greater than the **major** threshold level.

**Examples**

The following example configures downstream bandwidth in the global configuration mode, with 30% of downstream bandwidth reserved exclusively for voice traffic. Minor and major alarms for voice traffic are also set to be generated at 15% and 25% respectively.

```
Router(config)# cable admission-control ds-bandwidth voice minor 15 major 25 exclusive 30
```

**Related Commands**

| Command                                               | Description                                                                                                            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>cable admission-control</b>                        | Configures the CPU and memory thresholds for the Cisco CMTS router and supporting broadband processing engines (BPEs). |
| <b>cable admission-control event</b>                  | Configures and enables admission control event types on the Cisco CMTS router.                                         |
| <b>cable admission-control max-reserved-bandwidth</b> | Defines the maximum reserved bandwidth per bonding group for all service flows that are allowed by the Cisco CMTS.     |
| <b>cable admission-control us-bandwidth</b>           | Configures admission control upstream bandwidth thresholds on the Cisco CMTS router.                                   |
| <b>clear cable admission control counters</b>         | Clears all admission control resource counters on the Cisco CMTS router.                                               |

| Command                              | Description                                                                                                           |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>debug cable admission-control</b> | Enables automatic admission control troubleshooting processes on the Cisco CMTS router.                               |
| <b>show cable admission-control</b>  | Displays the current admission control configuration and status on the Cisco CMTS router or on a specified interface. |

# cable admission-control event

To configure admission control event types on a Cisco CMTS router, and to enable admission control for all previously configured resources on a Cisco CMTS router, use the **cable admission-control event** command in global configuration mode. To disable admission control event types on a Cisco CMTS router, use the **no** form of this command.

**cable admission-control event {cm-registration | dynamic-service}**

**no cable admission-control event** *event\_type*

|                    |                        |                                                                                                                                                                                                                                                                                                   |
|--------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>cm-registration</b> | Performs admission control checks when a cable modem registers with the Cisco CMTS router headend. This setting can be combined with the <b>dynamic-service</b> setting, in which cable modems are allowed to register but remain subject to a Quality of Service (QoS) policy on the Cisco CMTS. |
|                    | <b>dynamic-service</b> | Performs admission control checks each time a voice call is made, and rejects voice calls if they would impede QoS policies on the Cisco CMTS router. This setting can be combined with the <b>cm-registration</b> setting.                                                                       |

**Command Default** Admission control event types are not defined on the Cisco CMTS router.

**Command Modes** Global configuration

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router.                         |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** At least one event type must be configured in order to enable admission control on the Cisco CMTS router.

For additional Admission Control feature information, refer to the *Admission Control for the Cisco Cable Modem Termination System* document on Cisco.com.

**Examples** The following example configures each available option for the **cable admission-control event** command on the Cisco CMTS router.

```
Router(config)# cable admission-control event cm-registration
Router(config)# cable admission-control dynamic-service
```

| Related Commands | Command                                       | Description                                                                                                          |
|------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable admission-control</b>                | Configures the CPU and memory thresholds for a Cisco CMTS router and supporting broadband processing engines (BPEs). |
|                  | <b>cable admission-control ds-bandwidth</b>   | Configures admission control downstream bandwidth thresholds on a Cisco CMTS router.                                 |
|                  | <b>cable admission-control us-bandwidth</b>   | Configures admission control upstream bandwidth thresholds on a Cisco CMTS router.                                   |
|                  | <b>clear cable admission control counters</b> | Clears all admission control resource counters on a Cisco CMTS router.                                               |
|                  | <b>debug cable admission-control</b>          | Enables automatic admission control troubleshooting processes on a Cisco CMTS router.                                |
|                  | <b>show cable admission-control</b>           | Displays the current admission control configuration and status on a Cisco CMTS router, or on a specified interface. |

# cable admission-control max-reserved-bandwidth

To define the maximum reserved bandwidth per bonding group for all service flows that are allowed by the Cisco CMTS, use the **cable admission-control max-reserved-bandwidth** command in the interface configuration mode. To reset or disable the maximum reserved bandwidth value, use the **no** form of this command.

**cable admission-control max-reserved-bandwidth** *bw-in-kbps*

**no cable admission-control max-reserved-bandwidth**

|                           |                   |                                                                                                                                                                            |
|---------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>bw-in-kbps</i> | Maximum admission control reserved bandwidth. The value is in kbps and is based on the RF bandwidth percent defined for the bonding group. Valid range is from 0 to 14762. |
|---------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                        |                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | The max-reserved-bandwidth value is 80 percent of the aggregate bandwidth of the RF channels configured in the US or DS bonding group. |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| <b>Command History</b> | Release     | Modification                 |
|------------------------|-------------|------------------------------|
|                        | 12.2(33)SCC | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command allows the user to define the maximum reserved bandwidth per bonding group. The default maximum reserved bandwidth value is 80 percent. However the user can choose to configure a higher (up to 96 percent) or lower reserved bandwidth so that there is bandwidth allocated for zero committed information rate (CIR) best effort traffic. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows a sample definition of the maximum reserved bandwidth value. |
|-----------------|------------------------------------------------------------------------------------------|

```
Router> enable
Router# configure terminal
Router(config)# interface c5/0/1
Router(config-if)# cable admission-control max-reserved-bandwidth 6344
```

| <b>Related Commands</b> | Command                              | Description                                                                                                            |
|-------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------|
|                         | <b>cable admission-control</b>       | Configures the CPU and memory thresholds for the Cisco CMTS router and supporting broadband processing engines (BPEs). |
|                         | <b>cable admission-control event</b> | Configures and enables admission control event types on the Cisco CMTS router.                                         |

| Command                                     | Description                                                                                                           |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>cable admission-control ds-bandwidth</b> | Configures admission control downstream bandwidth thresholds on the Cisco CMTS router.                                |
| <b>cable admission-control us-bandwidth</b> | Configures admission control upstream bandwidth thresholds on the Cisco CMTS router.                                  |
| <b>debug cable admission-control</b>        | Enables automatic admission control troubleshooting processes on the Cisco CMTS router.                               |
| <b>show cable admission-control</b>         | Displays the current admission control configuration and status on the Cisco CMTS router or on a specified interface. |



# cable admission-control preempt priority-voice

To change the default PacketCable emergency 911 call preemption functions on a Cisco CMTS router to support throughput and bandwidth requirements for emergency 911 calls above all other buckets on the Cisco CMTS router, use the **cable admission-control preempt priority-voice** command in global configuration mode. To disable preemption and return the bucket that supports PacketCable emergency 911 calls to its default configuration, use the **no** form of this command.

**cable admission-control preempt priority-voice**

**no cable admission-control preempt priority-voice**

## Defaults

Emergency 911 call preemption and service flow admission control is enabled on the Cisco CMTS router.

## Command Modes

Global configuration

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router.                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

By default, PacketCable Emergency 911 calls are given priority on the Cisco CMTS. This priority may be preempted or removed from the Cisco CMTS router with non-standard configuration of the Service Flow Admission Control feature.

For additional information for Service Flow Admission Control beginning in Cisco IOS Release 12.3(21)BC, refer to the *Service Flow Admission Control for the Cisco Cable Modem Termination System* document on Cisco.com.

## Examples

The following example disables and then restores emergency 911 call preemption on the Cisco CMTS router.

```
Router(config)# no cable admission-control preempt priority-voice
Router(config)# cable admission-control preempt priority-voice
```

# cable admission-control us-bandwidth

To configure upstream bandwidth thresholds for admission control on a Cisco CMTS router, use the **cable upstream admission-control us-bandwidth** command in global configuration or interface configuration mode. To disable or to remove this configuration from a Cisco CMTS router or the specified port, use the **no** form of this command.

**cable admission-control us-bandwidth** [**sched** *scheduling-type* | **service** *service-class-name*]  
**minor** *minor-threshold* **major** *major-threshold* **exclusive** *exclusive-percentage* **non-exclusive**  
*non-exclusive-percentage*

**no cable admission-control us bandwidth** [**sched** *scheduling-type* | **service** *service-class-name*]  
**minor** *minor-threshold* **major** *major-threshold* **exclusive** *exclusive-percentage* **non-exclusive**  
*non-exclusive-percentage*

## Syntax Description

|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                                             | Upstream on the router interface.                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>us-bandwidth</b>                                  | Configures the upstream throughput thresholds.                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>sched</b> <i>scheduling-type</i>                  | (Optional) Specifies the scheduling type for a traffic class, where sched-type is one of the following values: <ul style="list-style-type: none"> <li>– <b>BE</b>—Selects best effort traffic.</li> <li>– <b>NRTPS</b>—Selects non-real-time polling service.</li> <li>– <b>RTPS</b>—Selects real time polling service.</li> <li>– <b>UGS-AD</b>—Selects UGS-AD service.</li> <li>– <b>UGS</b>—Selects UGS service.</li> </ul> |
| <b>service</b> <i>service-class-name</i>             | (Optional) Displays a string representing a previously defined service class. Instead of specifying a class by a scheduling type, this keyword can be used to specify a class using the <i>service-class-name</i> .                                                                                                                                                                                                            |
| <b>minor</b> <i>minor-threshold</i>                  | Sets the minor alarm threshold in a percentage value between 1 and 100.                                                                                                                                                                                                                                                                                                                                                        |
| <b>major</b> <i>major-threshold</i>                  | Sets the major alarm threshold in a percentage value between 1 and 100.                                                                                                                                                                                                                                                                                                                                                        |
| <b>exclusive</b> <i>exclusive-percentage</i>         | Represents the critical threshold for the upstream throughput resource in a percentage value between 1 and 100. Specifies the percentage of throughput reserved exclusively for this class.                                                                                                                                                                                                                                    |
| <b>non-exclusive</b> <i>non-exclusive-percentage</i> | Specifies the percentage of throughput, over and above the exclusive share, that can be used by this class. The <i>non-exclusive-percentage</i> value is an integer between 1 and 100. Because this throughput is non-exclusive, it can be used by other classes as specified.                                                                                                                                                 |

## Command Default

Admission control is disabled by default on a Cisco CMTS router.

**Command Modes**

Global configuration (config)

Interface configuration (config-if)

**Command History**

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced on the Cisco uBR10012 and the Cisco uBR7246VXR routers.                                |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCC | This command was modified to run on modular cable and integrated cable interfaces.                                 |

**Usage Guidelines**

Upstream bandwidth settings support all interfaces on a Cisco CMTS router through global configuration.

Upstream bandwidth settings can be further refined on a per-interface or per-upstream basis using interface configuration mode. Per-upstream settings provide the optimal upstream admission control granularity on the Cisco CMTS router.

When interface or per-upstream configuration is used in combination with global configuration, then interface or per-upstream configuration supersedes global configuration. Per-upstream configuration also supersedes per-interface configuration.

**Note**

The **critical** keyword is not present for the upstream throughput resource management with Cisco Admission Control.

**Note**

The **minor** threshold level cannot be greater than the **major** threshold level.

**Examples**

For additional Admission Control feature information and examples, refer to the *Admission Control for the Cisco Cable Modem Termination System* document on Cisco.com.

**Related Commands**

| Command                                               | Description                                                                                                            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>cable admission-control</b>                        | Configures the CPU and memory thresholds for the Cisco CMTS router and supporting broadband processing engines (BPEs). |
| <b>cable admission-control event</b>                  | Configures and enables admission control event types on the Cisco CMTS router.                                         |
| <b>cable admission-control ds-bandwidth</b>           | Configures admission control downstream bandwidth thresholds on the Cisco CMTS router.                                 |
| <b>cable admission-control max-reserved-bandwidth</b> | Defines the maximum reserved bandwidth per bonding group for all service flows that are allowed by the Cisco CMTS.     |
| <b>clear cable admission control counters</b>         | Clears all admission control resource counters on the Cisco CMTS router.                                               |

| Command                              | Description                                                                                                           |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>debug cable admission-control</b> | Enables automatic admission control troubleshooting processes on the Cisco CMTS router.                               |
| <b>show cable admission-control</b>  | Displays the current admission control configuration and status on the Cisco CMTS router or on a specified interface. |

# cable application-type include

To associate an application type with a specific and prioritized bucket on a Cisco CMTS router, use the **cable application-type include** command in global configuration mode. To remove the application type settings, use the **no** form of this command.

```
cable application-type bucket-number include { Best-effort | multicast application-id |
packetcable { normal | priority } | pcmm { app-id gate-app-id | priority gate-priority } |
sched-type type | service-class service-class-name }
```

```
no cable application-type bucket-number include { Best-effort | multicast application-id |
packetcable { normal | priority } | pcmm { app-id gate-app-id | priority gate-priority } |
sched-type type | service-class service-class-name }
```

| Syntax Description                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>bucket-number</i>                                                                    | Bucket number to which an application type is associated. Range is from 1 to 8, with 1 as the first in the sequence.                                                                                                                                                                                                                                                                                                                       |
| Best-effort                                                                             | Applies best effort committed information rate (CIR) to the specified bucket.                                                                                                                                                                                                                                                                                                                                                              |
| <i>multicast application-id</i>                                                         | Specifies the application identification for the multicast service flow. The valid range is 1 to 65535.                                                                                                                                                                                                                                                                                                                                    |
| <b>packetcable</b> { <b>normal</b>   <b>priority</b> }                                  | Specifies PacketCable service flows for the designated bucket, with the following priorities: <ul style="list-style-type: none"> <li><b>normal</b>—Selects PacketCable calls with normal priority.</li> <li><b>priority</b>—Selects PacketCable calls with high priority.</li> </ul>                                                                                                                                                       |
| <b>pcmm</b> { <b>app-id</b> <i>gate-app-id</i>   <b>priority</b> <i>gate-priority</i> } | Specifies PacketCable Multimedia (PCMM) service flows for the designated bucket, with the following options: <ul style="list-style-type: none"> <li><b>app-id</b> <i>gate-app-id</i>—Selects the gate application identifier from 0 to 65535. For each bucket, up to ten application type rules may be defined.</li> <li><b>priority</b> <i>gate-priority</i>—Selects the priority level from 0 to 7.</li> </ul>                           |
| <b>sched-type</b> <i>type</i>                                                           | Specifies upstream scheduling types, with one of the following additional keywords used for the DOCSIS scheduling type: <ul style="list-style-type: none"> <li><b>be</b>—Best effort.</li> <li><b>nrtps</b>—Non-real-time polling service.</li> <li><b>rtps</b>—Real-time polling service.</li> <li><b>ugs</b>—Unsolicited Grant Service.</li> <li><b>ugs-ad</b>—UGS-AD (unsolicited grant service-activity detection) service.</li> </ul> |
| <b>service-class</b> <i>service-class-name</i>                                          | Specifies the name of the service class being assigned to the designated bucket, where <i>service-class-name</i> is an alphanumeric string.                                                                                                                                                                                                                                                                                                |

**Command Default** Service flow admission control is enabled without the application types.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                                                                                                                             |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router.                                                                               |
|                 | 12.2(33)SCA | This command was introduced in Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. The <b>multicast</b> keyword was added to this command. |

**Usage Guidelines** The details of this command vary according to the bucket number and application type being mapped to a service flow on the Cisco CMTS router. This command overrides default service flow admission control settings on the Cisco CMTS.

#### Best Effort

The best effort CIR service flow rule may be applicable to both upstream and downstream. However, in the case of upstream service flows, in most cases, the same service flow may map both the rules.

For best effort, there is also the **sched-type** keyword option that applies to upstream service flows. This best effort scheduling type rule is applicable only for upstream service flows.

#### Service Classes

DOCSIS 1.1 introduced the concept of service classes. A service class is identified by a service class name. A service class name is a string the CMTS router associates with a QoS parameter set. One of the objectives of using a service class is to allow the high-level protocols to create the service flows with the desired QoS parameter set. Using a service class is a convenient way to bind the application with the service flows. The rules provide a mechanism to implement such binding.

Note the following factors when using the **service-class** keyword:

- Service classes are separately configured using the **cable match** command to provide the QoS for multicast traffic. This step maps a bucket using a rule to allocate bandwidth for multicast traffic.
- A named service class may be classified into any application type.
- Up to ten service class names may be configured per application type. Attempting to configure more than ten service classes results in an error message.

For additional information, refer to the Service Flow Admission Control feature documentation on Cisco.com.

**Examples** The following example maps high-priority PacketCable service flows into application bucket 5:

```
Router(config)# cable application-type 5 include packetcable priority
```

The following example maps normal PacketCable service flows into application bucket 1:

```
Router(config)# cable application-type 1 include packetcable normal
```

The following example maps the specified bucket number with PCMM service flow with a priority of 7, then maps an application identifier of 152 for the same bucket number:

```
Router(config)# cable application-type 2 include pcmm priority 7
Router(config)# cable application-type 2 include pcmm app-id 152
```

The following example maps both UGS and UGS-AD into bucket number 1:

```
Router(config)# cable application-type 1 include sched-type ugs
Router(config)# cable application-type 1 include sched-type ugs-ad
```

The following example maps the best effort CIR flows to bucket 3:

```
Router(config)# cable application-type 3 include Best-effort
```

The following example maps the service class name with a value of service-name1 into application bucket 3:

```
Router(config)# cable application-type 3 include service-class service-name1
```

The following example maps the multicast application type with a value of 18 into application bucket 3:

```
Router(config)# cable application-type 3 include multicast 18
```

#### Related Commands

| Command                                                   | Description                                                                                                                                                                                                                 |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable admission-control ds-bandwidth</b>               | Sets the minor, major, and exclusive thresholds for downstream voice or data bandwidth for all interfaces on the Cisco CMTS router.                                                                                         |
| <b>cable admission-control preempt priority-voice</b>     | Changes the default PacketCable emergency 911 call preemption functions on the Cisco CMTS router to support throughput and bandwidth requirements for emergency 911 calls above all other buckets on the Cisco CMTS router. |
| <b>cable admission-control us-bandwidth</b>               | Configures upstream bandwidth thresholds for admission control on the Cisco CMTS router.                                                                                                                                    |
| <b>cable application-type name</b>                        | Assigns an alphanumeric name for the specified bucket.                                                                                                                                                                      |
| <b>cable upstream admission-control</b>                   | Configures per-upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS router.                                                                                                             |
| <b>debug cable admission-control flow-categorization</b>  | Displays service flow categorization results, enabled when a service flow is classified.                                                                                                                                    |
| <b>show application-buckets</b>                           | Displays rules for any or all buckets supporting service flow admission control on the Cisco CMTS router.                                                                                                                   |
| <b>show interface cable admission-control reservation</b> | Displays service flows, categorizations, and bandwidth consumption on the Cisco CMTS router, for the specified interface, and the specified service flow direction.                                                         |

# cable application-type name

To assign an alphanumeric name for the specified bucket, use the **cable application-type name** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable application-type** *bucket-number* **name** *bucket-name*

**no cable application-type** *bucket-number* **name** *bucket-name*

## Syntax Description

|                      |                                                                                                                                                                                                                                  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>bucket-number</i> | Bucket number to which the name is applied. The priority sequence of the buckets, according to their original numeration of 1 to 8, still applies, whether the default bucket numbers or customized alphanumeric names are used. |
| <i>bucket-name</i>   | Alphanumeric bucket name.                                                                                                                                                                                                        |

## Command Default

Service flow admission control and the default configuration of this command is enabled.

## Command Modes

Global configuration

## Command History

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router.                       |
| 12.2(33)SCA | This command was introduced in Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

This bucket name appears in supporting **show** and **debug** commands along with the default bucket number.

For additional information, refer to the Service Flow Admission Control feature documentation on Cisco.com.

## Examples

The following example illustrates the use of descriptive names for the associated buckets:

```
Router(config)# cable application-type 2 name video
Router(config)# cable application-type 3 name gaming
```



| Related Commands | Command                                                   | Description                                                                                                                                                                                                    |
|------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable admission-control ds-bandwidth</b>               | Sets minor, major and exclusive thresholds for downstream voice or data bandwidth for each or all interfaces on the Cisco CMTS.                                                                                |
|                  | <b>cable admission-control preempt priority-voice</b>     | Changes the default PacketCable Emergency 911 call preemption functions on the Cisco CMTS, supporting throughput and bandwidth requirements for Emergency 911 calls above all other buckets on the Cisco CMTS. |
|                  | <b>cable admission-control us-bandwidth</b>               | Configures global or interface-level upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS.                                                                                 |
|                  | <b>cable application-type include</b>                     | Associates an application type with a specific and prioritized bucket on the Cisco CMTS.                                                                                                                       |
|                  | <b>cable upstream admission-control</b>                   | Configures per-upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS.                                                                                                       |
|                  | <b>debug cable admission-control flow-categorization</b>  | Displays service flow categorization results, enabled when a service flow is classified.                                                                                                                       |
|                  | <b>show application-buckets</b>                           | Displays rules for any or all buckets supporting Service Flow Admission Control on the Cisco CMTS.                                                                                                             |
|                  | <b>show interface cable admission-control reservation</b> | Displays service flows, categorizations, and bandwidth consumption on the Cisco CMTS, for the specified interface, and the specified service flow direction.                                                   |

# cable arp

To activate cable Address Resolution Protocol (ARP), use the **cable arp** command in cable interface or subinterface configuration mode. To block ARP requests for cable modems (CMs), use the **no** form of this command.

**cable arp**

**no cable arp**

## Syntax Description

This command has no arguments or keywords.

## Command Default

ARP is enabled.

## Command Modes

Cable interface and subinterface configuration

## Command History

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1T       | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 12.0(6)SC   | This command was supported.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 12.1(2) EC1 | This command was supported.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 12.1(3a)EC  | Subinterface support was added.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 12.2(8)BC1  | Interaction with the <b>clear arp-cache</b> command was changed. Previously, the <b>clear arp-cache</b> command sent an ARP request to a CM before clearing its ARP entry. Now, the <b>clear arp-cache</b> command clears the ARP entry without communicating with the CM. The CM (or its CPE devices) must send one or more IP packets to the CMTS before IP communications can be restored (assuming the CM or CPE devices are authorized to connect to the network). |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                                                                                                                                                                      |

## Usage Guidelines

ARP is an Internet protocol used to map IP addresses to MAC addresses on computers and other equipment installed in a network. You must activate ARP requests so that the Cisco CMTS router can perform IP address resolution on the downstream path.

Occasionally, you might want to use the **no cable arp** and **clear arp-cache** commands to block out new ARP requests and clear the existing ARP table. In this situation, the Cisco CMTS router will retain the ARP addresses of currently online CMs (CMs with a known IP address) and will continue to send ARP requests for those CMs when those ARP entries time out or are cleared, so that those CMs can continue to remain online. ARP requests for CMs that are currently offline and for any other unknown IP addresses, however, will remain blocked until ARP requests are reenabled on the downstream using the **cable arp** command.

**Note**

Using the **no cable arp** and **no cable proxy-arp** commands shifts all responsibility for the management of the IP addresses used by CMs and CPE devices to the DHCP server and provisioning system.

**Tip**

You can expect to see a temporary spike in CPU usage after initially giving the **no cable arp** command, because of the need to verify CPE IP addresses. CPU usage drops after the router has verified and learned all of the CPE IP addresses that are currently online. (This same situation occurs after initially enabling the **cable source-verify dhcp** command, because the router must send a DHCP LEASEQUERY request for every unknown CPE IP address.)

**Examples**

The following example shows how to activate cable ARP requests for port 0 on the cable interface line card installed in slot 6 of a Cisco CMTS router:

```
router(config)# interface cable 6/0
router(config-if)# cable arp
```

The following example shows how to activate cable ARP requests for port 0 on the cable interface line card installed in slot 6, subinterface 1, of a Cisco CMTS router:

```
router(config)# interface cable 6/0.1
router(config-subif)# cable arp
```

**Related Commands**

| Command                | Description                                       |
|------------------------|---------------------------------------------------|
| <b>clear arp-cache</b> | Clears the ARP table on the router.               |
| <b>cable proxy-arp</b> | Activates cable proxy ARP on the cable interface. |

## cable arp filter

To control the number of Address Resolution Protocol (ARP) packets that are allowable for each Service ID (SID) on a cable interface, use the **cable arp filter** command in cable interface configuration mode. To stop the filtering of ARP broadcasts for CMs, use the **no** form of this command.

**cable arp filter** { **reply-accept** | **request-send** } *number window-size*

**no cable arp filter** { **reply-accept** | **request-send** }

**default cable arp filter** { **reply-accept** | **request-send** }

### Syntax Description

|                     |                                                                                                                                                                                                                                                                          |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>reply-accept</b> | Configures the cable interface to accept only the specified <i>number</i> of ARP reply packets every <i>window-size</i> seconds for each active Service ID (SID) on that interface. The cable interface drops ARP reply packets for a SID that would exceed this number. |
| <b>request-send</b> | Configures the cable interface to send only the specified <i>number</i> of ARP request packets every <i>window-size</i> seconds for each active SID on that interface. The cable interface drops ARP requests for a SID that would exceed this number.                   |
| <i>number</i>       | Number of ARP reply packets that is allowed for each SID within the window time period. The allowable range is 0 to 20 packets, with a default of 4 packets. If <i>number</i> is 0, the cable interface drops all ARP reply packets.                                     |
| <i>window-size</i>  | Size of the window time period, in seconds, in which to monitor ARP requests. The valid range is 1 to 5 seconds, with a default of 2 seconds.                                                                                                                            |

### Command Default

ARP packets are not filtered, which means the Cisco CMTS router accepts all ARP reply packets and sends all ARP request packets.

### Command Modes

Cable interface configuration (config-if)

### Command History

| Release     | Modification                                                                                                                                                                                                                                                                                                              |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers.                                                                                                                                                                                                                      |
| 12.3(9a)BC  | The values of <i>number</i> and <i>window-size</i> are optional for the the respective <b>reply-accept</b> and <b>request-send</b> settings.<br>In this release and for earlier supporting releases, when ARP filtering is enabled, the default values for <i>number</i> and <i>window-size</i> are 4 and 2 respectively. |
| 12.3(17a)BC | In this release and for later releases, when ARP filtering is enabled, the default values for <i>number</i> and <i>window-size</i> are 3 and 2 respectively.                                                                                                                                                              |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                        |

**Usage Guidelines**

Viruses, worms, and theft-of-service attacks can generate a large volume of ARP requests on a cable interface. In some situations, the volume of ARP traffic can become so large that it throttles all other traffic.

To control the number of ARP replies and ARP requests that are allowed for each SID on a cable interface, use the **cable arp filter** command. This command configures the interface so that it accepts only a certain number of ARP reply or request packets per a specified time period. If a SID generates more ARP packets than what is allowed, the cable interface drops the excessive traffic.

By default, no ARP filtering is done. ARP filtering is enabled on individual cable interfaces, and you can choose to filter ARP packets only on the specific cable interfaces that require it. You can further choose to filter only ARP request packets, only ARP reply packets, or both. You can configure different threshold values on each interface, allowing you to customize the feature for each interface's traffic patterns.

If using bundled cable interfaces, the Cable ARP Filtering feature is configured separately on the master and slave interfaces. This allows you to configure the feature only on the particular interfaces that require it.

**Note**

Cisco IOS Release 12.3(9a)BC introduces enhanced command option syntax for the **cable arp filter** command, where *number* and *window-size* values are optional for **reply-accept** and **request-send** settings.

**Note**

Disabling the cable ARP filtering feature, using the **no cable arp filter** command, does not reset the ARP packet counters. The ARP packet counters do not increment when cable ARP filtering is disabled, but the counters retain their current values until the interface counters are specifically cleared, using the **clear counters** command.

**Linksys Wireless-B BEFW11S4 Router**

The Linksys Wireless-B Broadband Router BEFW11S4 version 4 with 1.44.2 firmware incorrectly sends its own ARP reply packet for every ARP request packet it receives, instead of replying only to the ARP requests that are specifically for itself. Customers with these routers should upgrade the firmware to the latest revision to fix this bug. To upgrade the firmware, go to the download section on the Linksys web site.

The following example shows how to filter cable ARP reply packets, so that the cable interface accepts a maximum of 15 ARP replies every three seconds per SID:

```
Router(config)# interface cable 5/1/0
Router(config-if)# cable arp filter reply-accept 15 3
```

The following example shows how to filter cable ARP request packets, so that the cable interface sends a maximum of 10 requests per second per SID:

```
Router(config)# interface cable 6/0
Router(config-if)# cable arp filter request-send 10 1
```

The following example shows how to enable the filtering of cable ARP request and reply packets on a cable interface, using the default values of 4 packets per CPE per every 2 seconds:

```
Router(config)# interface cable 3/0
Router(config-if)# default cable arp filter reply-accept
Router(config-if)# default cable arp filter request-send
Router(config-if)# end
Router# show running-config | include filter
```

```

cable arp filter reply-accept 4 2
cable arp filter request-send 4 2

```

The following example shows how to disable the filtering of cable ARP request and reply packets on a cable interface:

```

Router(config)# interface cable 1/0
Router(config-if)# no cable arp filter reply-accept
Router(config-if)# no cable arp filter request-send

```

#### Related Commands

| Command                       | Description                                                                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable arp</b>              | Activates cable ARP.                                                                                                                              |
| <b>cable proxy-arp</b>        | Activates cable proxy ARP on the cable interface.                                                                                                 |
| <b>clear arp-cache</b>        | Refreshes dynamically created entries from the ARP cache.                                                                                         |
| <b>clear counters</b>         | Clears the packet counters on all interfaces or on a specific interface.                                                                          |
| <b>debug cable arp filter</b> | Displays debugging messages about the filtering of ARP broadcasts.                                                                                |
| <b>show cable arp-filter</b>  | Displays the total number of ARP replies and requests that have been sent and received, including the number of requests that have been filtered. |

# cable attribute-mask

To configure an attribute for a modular cable interface, use the **cable attribute-mask** command in interface configuration mode. To disable this configuration, use the **no** form of this command.

**cable attribute-mask** *mask*

**no cable attribute-mask** *mask*

|                           |             |                                             |
|---------------------------|-------------|---------------------------------------------|
| <b>Syntax Description</b> | <i>mask</i> | Specifies the mask value for the interface. |
|---------------------------|-------------|---------------------------------------------|

|                        |                                                                                                                                                               |  |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Command Default</b> | If this command is not used, the default attribute will be used for the modular cable interface. The default attribute for a modular cable interface is zero. |  |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCB    | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The attribute mask comprises 32 attributes and each attribute represents a single bit in the mask. You can configure a provisioned attribute mask for each channel and provisioned bonding group to assign values to the operator-defined binary attributes, or to override the default values of the specification-defined attributes. The operator may configure, in the CM configuration file, a required attribute mask and a forbidden attribute mask for a service flow. Additionally, in a CM-initiated dynamic service request, the CM can include a required attribute mask and a forbidden attribute mask for a service flow. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to configure an attribute for a modular cable interface: |
|-----------------|------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# interface modular-cable 1/0/0:0
Router(config-if)# cable attribute-mask 2000ff00
```

|                         |                                        |                                                                   |
|-------------------------|----------------------------------------|-------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>                         | <b>Description</b>                                                |
|                         | <b>interface modular-cable</b>         | Specifies a modular cable interface.                              |
|                         | <b>cable downstream attribute-mask</b> | Specifies an attribute mask value for a wideband cable interface. |
|                         | <b>interface wideband-cable</b>        | Specifies a wideband cable interface.                             |
|                         | <b>interface cable</b>                 | Specifies a cable interface.                                      |

# cable bgsync

To set the data intervals for the background synchronization of SNMP MIB data on the Cisco CMTS, use the **cable bgsync** command in global configuration mode. To disable background synchronization, use the **no** form of this command.

**cable bgsync** {itime *i-interval* | ptime *p-interval*}

**no cable bgsync**

## Syntax Description

|                   |                                                                                                                 |
|-------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>itime</b>      | Indicates the data interval time between two interval synchronizations.                                         |
| <b>ptime</b>      | Indicates the incremental data interval time between two synchronizations.                                      |
| <i>i-interval</i> | Length of the data interval in seconds. The valid range is from 5 to 31536000. The default value is 86400.      |
| <i>p-interval</i> | Length of the incremental data interval in seconds. The valid range is from 5 to 86400. The default value is 5. |

## Command Default

This command is enabled by default.

## Command Modes

Global configuration mode (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCG | This command was introduced. |

## Usage Guidelines

Use the **cable bgsync** command to set the data intervals for background synchronization.

For more information about MIB objects that are synchronized during background synchronization, see the Cisco [CMTS Universal Broadband Router Series MIB Specifications Guide 12.2SC](#).

## Examples

The following example shows how to set the data intervals for background synchronization on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# cable bgsync itime 3600
Router(config)# cable bgsync ptime 6
Router(config)#
```

## Related Commands

| Command                      | Description                                                                           |
|------------------------------|---------------------------------------------------------------------------------------|
| <b>cable bgsync active</b>   | Activates background synchronization process on the Cisco CMTS.                       |
| <b>clear bgsync counters</b> | Clears the background synchronization counters on the Cisco CMTS.                     |
| <b>show cable bgsync</b>     | Displays the information on the background synchronization process on the Cisco CMTS. |



# cable bgsync active

To activate the background synchronization process on the Cisco CMTS, use the **cable bgsync active** command in global configuration mode. To deactivate the background synchronization process, use the **no** form of this command.

**cable bgsync active**

**no cable bgsync active**

**Syntax Description** This command has no arguments or keywords.

**Command Default** This command is enabled by default.

**Command Modes** Global configuration mode (config)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

**Usage Guidelines**

Use the **cable bgsync active** command to activate the background synchronization process.

SNMP objects use interprocess communication (IPC) to access data between the line card and the route processor (RP). When SNMP queries are sent to a Cisco CMTS with large number of modems configured, IPC takes a long time to retrieve the information from the line card and pass it on to the RP. This resulted in an increase in the SNMP response time.

The background synchronization process slowly synchronizes the data between the line card and the RP. Therefore, when SNMP queries are sent to the Cisco CMTS, the Cisco CMTS returns the SNMP data from the RP. IPC requests are not sent to retrieve the data, thereby improving the SNMP performance.

The background synchronization process is enabled by default on the Cisco uBR10012, and Cisco 7200 Series routers.

For more information about the MIB objects that are synchronized during background synchronization, see the [Cisco CMTS Universal Broadband Router Series MIB Specifications Guide 12.2SC](#).

**Examples** The following example shows how to deactivate the background synchronization process on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# no cable bgsync active
Router(config)#
```

**Related Commands**

| Command                      | Description                                                                            |
|------------------------------|----------------------------------------------------------------------------------------|
| <b>cable bgsync</b>          | Sets the data intervals for background synchronization on the Cisco CMTS.              |
| <b>show cable bgsync</b>     | Displays the information on the background synchronization process, on the Cisco CMTS. |
| <b>clear bgsync counters</b> | Clears the background synchronization counters on the Cisco CMTS.                      |

# cable bonding-group-id

**Note**

Effective with Cisco IOS Release 12.2(33)SCE, the **cable bonding-group-id** command is replaced by the **cable bonding-group-secondary** command. See the **cable bonding-group-secondary** command for more information.

To specify a Bonding Group ID and indicate whether the bonding group is a primary or secondary bonded channel, use the **cable bonding-group-id** command in wideband-cable interface configuration mode. To remove a bonding group configuration and revert to the default bonding group (a primary bonding group), use the **no** form of this command.

**cable bonding-group-id** *id\_num* [**secondary**]

**no cable bonding-group-id** *id\_num* [**secondary**]

**Syntax Description**

|                  |                                                                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>id_num</i>    | A unique Bonding Group ID. Valid values are 1 to 255. The bonding group ID must be unique for each wideband channel on the CMTS.                          |
| <b>secondary</b> | Specifies that the bonding group is a secondary bonding group. If the <b>secondary</b> keyword is not used, the bonding group is a primary bonding group. |

**Command Default**

If the **cable bonding-group-id** command is not issued, Cisco IOS software assigns a default ID to the bonding group and configures the wideband-channel cable interface as a primary bonding group.

**Command Modes**

Interface configuration mode for a wideband-cable interface (config-if)

**Command History**

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCE | This command was replaced with the <b>cable bonding-group-secondary</b> command.                                   |

**Usage Guidelines**

The **cable bonding-group-id** command is *not needed* for the wideband channels that will be received by the Scientific Atlanta DPC2505 or EPC2505 wideband cable modems.

The **cable bonding-group-id** command is used only for wideband channels that will be received by the Linksys WCM300-NA, WCM300-EURO, or WCM300-JP wideband cable modems.

### Linksys WCM300 Cable Modem

For wideband channels that will be received by the Linksys WCM300-NA, WCM300-EURO, and WCM300-JP cable modems, the **cable bonding-group-id** command assigns a Bonding Group ID to a wideband-channel cable interface and configures the bonding group as a primary bonding group if the **secondary** keyword is not specified, or as a secondary bonding group if the **secondary** keyword is specified.

- A primary bonding group is a primary bonded channel.
- A secondary bonding group is a secondary bonded channel.

The primary bonded channel is the wideband channel on which the Linksys WCM300 modem receives all of its unicast traffic and some of its multicast traffic. The cable modem may identify the primary bonded channel and any secondary bonded channels to the CMTS at cable modem registration time. The DOCSIS configuration file may define the primary bonded channel for the CMTS to assign to the cable modem.

In addition to joining one primary bonded channel, the Linksys WCM300 may join up to two secondary bonded channels simultaneously in order to receive additional data streams. The DOCSIS configuration file may define the secondary bonded channels for the modem to pass to the CMTS. Secondary bonded channels are intended to receive multicast traffic such as broadcast video that is not available on the primary bonded channel.

For information on the TLV encodings that can be used in the DOCSIS configuration file to identify primary and secondary bonded channels, see the *Cisco Cable Wideband Solution Design and Implementation Guide, Release 1.0*.



#### Note

If a wideband channel is specified as a primary or secondary bonded channel in the DOCSIS configuration file, it *must be identically defined* as a primary or secondary bonded channel in the CMTS active, running configuration file.

- If a wideband channel is configured with the **cable bonding-group-id** command or by default to be a primary bonded channel, the Linksys WCM300 modem will not register using it as one of its secondary bonded channels.
- If a wideband channel is configured with the **cable bonding-group-id** command to be a secondary bonded channel, the Linksys WCM300 modem will not register using it as its primary bonded channel.



#### Note

When a wideband channel is defined on a Wideband SPA, Cisco IOS software configures the wideband channel as a primary bonding group (primary bonded channel) and assigns a default ID to the bonding group. If a wideband channel is to be used as a secondary bonded channel, use the **cable bonding-group-id** command with the **secondary** keyword to specify that the channel is a secondary bonded channel.

If you specify a non-unique Bonding Group ID for the *id\_num* argument, **cable bonding-group-id** displays an error message and does not modify the ID.

### Scientific Atlanta DPC2505 Cable Modem

The **cable bonding-group-id** command *is not needed* for the wideband channels that will be received by the Scientific Atlanta DPC2505 or EPC2505 cable modems.

## Examples

The following examples show how to use the **cable bonding-group-id** command for a variety of purposes. The following **cable bonding-group-id** command specifies that wideband channel 10 on the Wideband SPA in slot/subslot/bay 1/0/1 will be a secondary bonding group (secondary bonded channel) having the bonding group ID 20.

```
Router# configure terminal
Router(config)# interface wideband-cable 1/0/1:10
Router(config-if)# cable bonding-group-id 20 secondary
```

The following example shows how to change a bonding group with an ID of 20 from a secondary to a primary bonding group by omitting the **secondary** keyword:

```
Router(config-if)# cable bonding-group-id 20
```

The **no** form of the **cable bonding-group-id** removes the configured bonding group and reverts the configuration to the default bonding group. For a secondary bonding group with the ID of 20, the following **no** forms of the command are equivalent:

```
Router(config-if)# no cable bonding-group-id 20
```

or

```
Router(config-if)# no cable bonding-group-id 20 secondary
```

When either of the preceding commands are issued, the wideband-channel cable interface is configured to use a default bonding group, which has a default bonding group ID assigned by Cisco IOS software and is a primary bonding group.

## Related Commands

| Command          | Description                          |
|------------------|--------------------------------------|
| <b>interface</b> | Enters interface configuration mode. |

# cable bonding-group-secondary

To specify a bonding group as a secondary bonded channel, use the **cable bonding-group-secondary** command in wideband-cable interface configuration mode. To remove the bonding group configuration and revert to the default bonding group (a primary bonding group), use the **no** form of this command.

**cable bonding-group-secondary**

**no cable bonding-group-secondary**

## Command Default

If the **cable bonding-group-secondary** command is not issued, Cisco IOS software configures the wideband-channel cable interface as the primary bonding group.

## Command Modes

Interface configuration mode (config-if) for a wideband-cable interface

## Command History

| Release     | Modification                                                                      |
|-------------|-----------------------------------------------------------------------------------|
| 12.2(33)SCE | This command was introduced for the Cisco uBR-MC3GX60V cable interface line card. |

## Usage Guidelines

Starting with Cisco IOS Release 12.2(33)SCE, the **cable bonding-group-secondary** command replaces the **cable bonding-group-id** command. If you upgrade from an earlier Cisco IOS Release to Cisco IOS Release 12.2(33)SCE and later, the **cable bonding-group-id** command will no longer change the bonding-group ID.

The **cable bonding-group-secondary** command is used only for wideband channels that are received by the Linksys WCM300-NA, WCM300-EURO, or WCM300-JP wideband cable modems.

### Linksys WCM300 Cable Modem

For wideband channels that are received by the Linksys WCM300-NA, WCM300-EURO, and WCM300-JP cable modems, the **show controllers Modular-Cable slot/subslot/controller wideband** command displays the bonding group ID of a wideband-channel cable interface and the **cable bonding-group-secondary** command configures the bonding group as a secondary bonding group.

The primary bonded channel is the wideband channel on which the Linksys WCM300 modem receives all of its unicast traffic and some of its multicast traffic. The cable modem identifies the primary bonded channel and any secondary bonded channels to the CMTS at cable modem registration time. The DOCSIS configuration file defines the primary bonded channel for the CMTS to assign to the cable modem.

In addition to joining one primary bonded channel, the Linksys WCM300 joins up to two secondary bonded channels simultaneously in order to receive additional data streams. The DOCSIS configuration file defines the secondary bonded channels for the modem to pass to the CMTS. Secondary bonded channels are intended to receive multicast traffic such as broadcast video that is not available on the primary bonded channel.

For information on the TLV encodings that can be used in the DOCSIS configuration file to identify primary and secondary bonded channels, see *Cisco Cable Wideband Solution Design and Implementation Guide, Release 1.0*.

**Note**

If a wideband channel is specified as a primary or secondary bonded channel in the DOCSIS configuration file, it *must be identically defined* as a primary or secondary bonded channel in the CMTS active, running configuration file.

The following points list the restrictions for configuring the wideband channel with the **cable bonding-group-secondary** command:

- If a wideband channel is not configured with the **cable bonding-group-secondary** command, the Linksys WCM300 modem may not use it as a secondary bonding group.
- If a wideband channel is configured with the **cable bonding-group-secondary** command to be a secondary bonded channel, the Linksys WCM300 modem may not use it as a primary bonded group.

**Note**

When a wideband channel is defined, the Cisco IOS software configures the wideband channel as a primary bonding group (primary bonded channel) and assigns a default ID to the bonding group. If a wideband channel is to be used as a secondary bonded channel, use the **cable bonding-group-secondary** command to specify that the channel is a secondary bonded channel.

**Examples**

The following example shows how to use the **cable bonding-group-secondary** command:

```
Router# configure terminal
Router(config)# interface wideband-cable 1/0/1:10
Router(config-if)# cable bonding-group-secondary
```

**Related Commands**

| Command          | Description                          |
|------------------|--------------------------------------|
| <b>interface</b> | Enters interface configuration mode. |

# cable bundle

To configure a cable interface to belong to an interface bundle, use the **cable bundle** command in cable interface configuration mode. To delete a cable interface bundle definition, use the **no** form of this command.

**cable bundle** *n* [**master**]

**no cable bundle** *n* [**master**]

## Syntax Description

|               |                                                                |
|---------------|----------------------------------------------------------------|
| <i>n</i>      | Specifies the bundle identifier. Valid range is from 1 to 255. |
| <b>master</b> | (Optional) Defines the specified interface as the master.      |

## Defaults

No default behavior or values

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(1a)T1  | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 12.0(8)SC   | This command was supported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 12.1(2)EC1  | This command was supported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 12.2(15)BC2 | This command was enhanced, so that adding an interface as a slave interface automatically removes the following Layer 3 parameters, if they are configured on that interface: IP address, IP helper address, IP access group, PIM configuration, and IP policy-based routing.<br><br>Also, creating subinterfaces on slave interfaces has been specifically prohibited. Previously, subinterfaces could be created on slave interfaces, although a warning message appeared advising users to remove the subinterface. |
| 12.3(13)BC  | The <b>master</b> keyword was removed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                                                                                                                                                                                                                     |

## Usage Guidelines

You can configure a maximum of four interface bundles. In each bundle, specify one interface as the master interface by using the optional **master** keyword. The cable interface that is designated as master is configured with Layer 3 configuration such as primary and secondary IP addresses and other Layer 3 specific configuration commands such as the **cable arp** command.

The following guidelines are required when using bundled cable interfaces:

- Configure an IP address only on the master interface. Any attempt to add an interface to a bundle is rejected, if an IP address is configured and the interface is not specified as master interface.



- You must specify all generic IP networking information (IP address, routing protocols, switching modes, and so on) on the bundle master interface. Do not specify generic IP networking information on bundle slave interfaces.
- If you attempt to add an interface to a bundle as slave interface and an IP address is assigned to this interface, the command fails. You must remove the IP address configuration before you can add the interface to a bundle.
- If you have configured an IP address on a bundled interface and the interface is not the master interface, a warning message appears.
- Do not create subinterfaces on a slave interface. In Cisco IOS Release 12.2(15)BC2 and later releases, this is specifically prohibited. In prior releases, a warning message appeared when trying to create a subinterface on a slave interface, but the subinterface was still created.

Specify generic (that is, not downstream or upstream) cable interface configurations, such as source-verify or Address Resolution Protocol (ARP) handling, on the master interface. Do not specify generic configuration on nonmaster interfaces.

If you configure an interface as part of a bundle and it is not the master interface, all generic cable configuration for this interface is removed. This includes the IP address, access groups, PIM configuration, and any other IP Layer 3 configurations. The master interface configuration then applies to all interfaces in the bundle.

**Tip**

We recommend configuring the **no ip address** command on all slave interfaces. This command is optional but recommended, because the **show ip interface brief** command reports an interface as being not OK if its configuration does not include some form of the **ip address** command. Specifying **no ip address** corrects this.

When creating subinterfaces over the bundle master, the bundle master is not assigned any IP address and only the subinterfaces are assigned IP addresses, helper addresses, and other Layer 3 configurations. The reason the bundle master is not assigned an IP address is because CMs are associated with subinterfaces rather than with a bundle master.

**Note**

Cable interface bundling is applicable only in two-way cable configurations. It is not supported in telco-return configurations.

If you shut down or remove the master interface in a bundle, no data packets is sent to any of the interfaces in this bundle. Packets are still physically received from nonmaster interfaces that have not been shut down, but those packets are discarded. This means that CMs connected to those interfaces are not disconnected immediately, but CMs coming online are not able to obtain an IP address, download their configuration file, or renew their IP address assignment if the DHCP lease expires.

If you shut down a slave interface, only this shutdown interface is affected.

**Note**

When using bundled interfaces, the **show interface cable** command divides the interface counters between the master and slave interfaces. The output for the master interface shows the upstream packets per second count, while the output for the slave interfaces shows the downstream packets per second count.

## Examples

See the following example to configure interface 25 to be the master interface:

```
Router(config)# interface cable 3/0
Router(config-if)# cable bundle 25 master
Router(config-if)#
07:28:17: %UBR7200-5-UPDOWN: Interface Cable3/0 Port U0, changed state to down
07:28:18: %UBR7200-5-UPDOWN: Interface Cable3/0 Port U0, changed state to up
```

The following example shows the error message you get if you try to configure an interface with an IP address that is not the master interface:

```
Router(config)# interface cable 3/0
Router(config-if)# cable bundle 5
Please remove ip address config first then reenter this command
Router(config-if)#
```

The following example shows how to remove a cable interface from a bundle:

```
Router(config)# interface cable 5/1/0
Router(config-if)# no cable bundle 5
Router(config-if)#
```



### Note

When you remove a slave cable interface from a bundle (using the **no cable bundle** command), you must manually reconfigure all of the Layer 3 IP information on the interface, before cable modems can resume communicating on that interface.

## Related Commands

| Command                  | Description                                                       |
|--------------------------|-------------------------------------------------------------------|
| <b>show cable bundle</b> | Displays the forwarding table for the specified interface bundle. |

# cable clock clear-counters

To reset the counters that are displayed with the **show controllers clock-reference** command, use the **cable clock clear-counters** command in privileged EXEC mode.

## cable clock clear-counters

**Syntax Description** This command has no keywords or arguments.

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                                                                                         |
|-----------------|------------|----------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(1a)T1 | This command was introduced.                                                                                         |
|                 | 12.1(2)EC1 | This command was supported on the EC train for the Cisco uBR7246VXR router.                                          |
|                 | 12.2(2)XF  | This command was supported for the TCC+ card on Cisco uBR10012 routers.                                              |
|                 | 12.2(4)BC1 | Support for this command was added to the Release 12.2 BC train for the Cisco uBR7246VXR and Cisco uBR10012 routers. |
|                 | 12.3(23)BC | This command is supported only for standalone (freerun) mode.                                                        |

**Usage Guidelines** This command resets any counters that were displayed from the last time the **show controllers clock-reference** command was used.

**Note**

This command is not supported on the SC train.

This command supports the Cisco CMTS clock feature set, which provides a synchronized clock for improved Voice-over-IP (VoIP) operations. The clock feature set requires one of the following configurations:

- A Cisco uBR10012 router with one or two TCC+ cards that are connected to an external national clock source.

**Note**

Beginning in Cisco IOS Release 12.3(23)BC, TCC+ is replaced with the DOCSIS Timing and Control Card (DTCC) and does not require to be connected to an external national clock source.

- A Cisco uBR7246 VXR router using a Cisco uBR-MC16S, Cisco uBR-MC16E, Cisco uBR-MC28C, or Cisco uBR-MC28C-BNC cable interface line card. The router must also be equipped with a Cisco cable clock card and be running Cisco IOS Release 12.1(1a)T1, Cisco IOS Release 12.1(2)EC1, or a later release. The Cisco cable clock card should be connected to an external national clock source.

Only these cable interface cards support the external clock card reference from a clock card to distribute that signal to CMs or set-top boxes (STBs) attached to the specific network segments. You can use other cable interface cards, such as the Cisco uBR-MC16C, with the clock card, but these other cable interfaces will not synchronize their downstream SYNC messages with the external clock source.

Each CM or STB must also support VoIP applications and the clock feature set. For example, the Cisco uBR924, running Cisco IOS Release 12.0(7)T or later releases, supports the clock card feature automatically.

**Note**

The **show controllers clock-reference** command might display compare errors on the Cisco uBR10012 router because there could be a slight delay at system startup before the clock cards synchronize with each other. These initial compare errors can be ignored and cleared with the **cable clock clear-counters** command.

**Examples**

The following example shows how to reset all counters that are displayed for the clock card:

```
Router# cable clock clear-counters
```

**Related Commands**

| Command                                 | Description                                           |
|-----------------------------------------|-------------------------------------------------------|
| <b>show controllers clock-reference</b> | Displays the cable clock card's hardware information. |

# cable clock dti

To configure the DOCSIS Timing Interface (DTI) clock reference mode, use the **cable clock dti** command in global configuration mode. To terminate the DTI clock reference mode and restart the standalone mode, use the **no** form of the command.

**cable clock dti**

**no cable clock dti**

**Syntax Description** This command has no keywords or arguments.

**Command Default** Standalone mode

**Command Modes** Global configuration

| Release    | Modification                                               |
|------------|------------------------------------------------------------|
| 12.3(23)BC | This command was introduced for the Cisco uBR10012 router. |

**Usage Guidelines** Use this command to configure DTI clocking mode. This command may be stored in NVRAM as part of the DOCSIS Timing and Control Card (DTCC) configuration.

**Examples**

```
Router# config terminal
Router(config)# cable clock dti
```

| Command              | Description               |
|----------------------|---------------------------|
| show cable clock dti | Displays DTI information. |

# cable clock dti clear-counters

To reset the counters that are displayed with the **show cable clock dti counters** command in DOCSIS Timing Interface (DTI) mode, use the **cable clock dti clear-counters** command in privileged EXEC mode.

**cable clock dti clear-counters** *slot/subslot*

| Syntax Description | <i>slot/subslot</i> | Specifies the slot and subslot location of the DTCC ports. Valid values are 1/1 or 2/1. |
|--------------------|---------------------|-----------------------------------------------------------------------------------------|
|--------------------|---------------------|-----------------------------------------------------------------------------------------|

| Command Default | No default behavior or values |
|-----------------|-------------------------------|
|-----------------|-------------------------------|

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | Release    | Modification                                               |
|-----------------|------------|------------------------------------------------------------|
|                 | 12.3(23)BC | This command was introduced on the Cisco uBR10012 router . |

| Usage Guidelines | This command resets any counters that were displayed from the last time the <b>show cable clock dti client</b> command was used in DTI mode. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
|                  | This command supports the Cisco CMTS clock feature set, which provides a synchronized clock for improved Voice-over-IP (VoIP) operations.    |

| Examples | The following example shows how to reset all counters that are displayed for the clock card: |
|----------|----------------------------------------------------------------------------------------------|
|----------|----------------------------------------------------------------------------------------------|

```
Router# cable clock dti clear-counters
```

| Related Commands | Command                              | Description                                           |
|------------------|--------------------------------------|-------------------------------------------------------|
|                  | <b>show cable clock dti counters</b> | Displays the cable clock card's hardware information. |

# cable clock force

To select the external timing source when the clock card is in holdover mode, use the **cable clock force** command in global configuration mode. To disable the selection and return to the default, use the **no** form of this command.

**cable clock force {primary | secondary}**

**no cable clock force**

## Syntax Description

**primary** Forces the primary source to act as the clock reference.

**secondary** Forces the secondary source to act as the clock reference.

## Command Default

The clock card automatically uses the primary external source, if available. If the primary source fails, the clock card enters holdover mode and, after a few seconds, switches to the secondary external source. The clock card switches back to the primary source when it becomes available.

## Command Modes

Global configuration (config)

## Command History

| Release    | Modification                                                   |
|------------|----------------------------------------------------------------|
| 12.1(1a)T1 | This command was introduced.                                   |
| 12.1(2)EC1 | This command was integrated into Cisco IOS Release 12.1(2)EC1. |

## Usage Guidelines

This command overrides the default behavior of the clock card when the clock card is in holdover mode. If the clock card is not in holdover mode, this command is ignored. You cannot force the reference to a port if the clock card is in free-running mode.



### Note

This command is not applicable on the SC train.



### Note

The clock card enters holdover mode if the forced reference is lost, even if the other external reference is available.

To support the clock feature set in VoIP configurations, a Cisco uBR7246 VXR chassis, equipped with a clock card; and a Cisco uBR-MC16S, a Cisco uBR-MC16E, or a Cisco uBR-MC28C cable interface line card must be used running Cisco IOS Release 12.1(1a)T1 or later releases. Only these cable interface line cards support the external clock card reference from a clock card to distribute that signal to CMs or set-top boxes (STBs) attached to the specific network segments. You can use other cable interface cards, such as the Cisco uBR-MC16C, with the clock card, but these other cable interfaces will not synchronize their downstream SYNC messages with the external clock source.

Each CM or STB must also support VoIP applications and the clock feature set. For example, the Cisco uBR924, running Cisco IOS Release 12.0(7)T or later releases, supports the clock card feature automatically.

### Examples

The following example shows how to force the timing reference for the cable clock card to come from the secondary external source, when the clock card is in holdover mode:

```
Router(config)# cable clock force secondary
```

### Related Commands

| Command                                 | Description                                                                                    |
|-----------------------------------------|------------------------------------------------------------------------------------------------|
| <b>show cable clock</b>                 | Displays status information for the cable clock card.                                          |
| <b>show controllers clock-reference</b> | Displays hardware information, register values, and current counters for the cable clock card. |



# cable clock source-midplane

To make the midplane time-division multiplexing (TDM) clock the primary timing reference for the clock card, use the **cable clock source-midplane** command in global configuration mode. To disable the selection and return to the default, use the **no** form of this command.

**cable clock source-midplane**

**no cable clock source-midplane**

## Syntax Description

This command has no keywords or arguments.

## Command Default

The clock card does not get its timing reference from the midplane TDM clock.

## Command Modes

Global configuration (config)

## Command History

| Release    | Modification                                                   |
|------------|----------------------------------------------------------------|
| 12.1(1a)T1 | This command was introduced.                                   |
| 12.1(2)EC1 | This command was integrated into Cisco IOS Release 12.1(2)EC1. |
| 12.3BC     | This command was integrated into Cisco OS Release 12.3BC.      |

## Usage Guidelines

Because the clock card automatically provides the timing reference to the midplane TDM clock, the midplane cannot in turn act as the reference for the clock card. This means that the **cable clock source-midplane** command does not take effect unless a port adapter is configured as the primary clock reference source for the midplane.



### Note

This command is not applicable on the SC train.

To support the clock feature set in VoIP configurations, a Cisco uBR7246 VXR chassis, equipped with a clock card; and a Cisco uBR-MC16S, a Cisco uBR-MC16E, or a Cisco uBR-MC28C cable interface line card must be used running Cisco IOS Release 12.1(1a)T1 or higher releases. Only these cable interface line cards support the external clock card reference from a clock card to distribute that signal to CMs or set-top boxes (STBs) attached to the specific network segments. You can use other cable interface cards, such as the Cisco uBR-MC16C, with the clock card, but these other cable interfaces will not synchronize their downstream SYNC messages with the external clock source.

Each CM or STB must also support VoIP applications and the clock feature set. The Cisco uBR924, running Cisco IOS Release 12.0(7)T or later releases, supports the clock card feature automatically.

## Examples

The following example shows how to set the primary clock reference to the midplane TDM clock:

```
Router(config)# cable clock source-midplane
```

 cable clock source-midplane

| Related Commands | Command          | Description                                           |
|------------------|------------------|-------------------------------------------------------|
|                  | show cable clock | Displays status information for the cable clock card. |

# cable clock upgrade

To upgrade the Field-Programmable Gate Array (FPGA) image manually on the DOCSIS Timing & Control Card (DTCC), use the **cable clock upgrade** command in privileged EXEC mode.

**cable clock upgrade** *slot/subslot*

## Syntax Description

|                |                                                                    |
|----------------|--------------------------------------------------------------------|
| <i>slot</i>    | Chassis slot number of the DTCC card. The valid slot is 1.         |
| <i>subslot</i> | Secondary slot number of the DTCC card. Valid subslots are 1 or 2. |

## Command Default

None

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

In Cisco IOS Release 12.2(33) SCC and later, you can manually upgrade the FPGA image only if a single DTCC card is installed on the Cisco uBR 10012 router. If the manual upgrade fails or is interrupted, the DTCC card may become unusable. Do not reset or unplug the DTCC card during the manual upgrade. We recommend that you take precaution against extended downtime if the FPGA upgrade fails unexpectedly by having a standby DTCC card installed on the Cisco uBR10012 router.



### Note

You will have to enter **y (yes)** when the system prompts you to continue the manual upgrade.

## Examples

The following example shows how to start the manual FPGA upgrade process on the DTCC card:

```
Router# cable clock upgrade 1/1
```

## Related Commands

| Command                | Description                                                        |
|------------------------|--------------------------------------------------------------------|
| <b>cable clock dti</b> | Configures the DOCSIS Timing Interface (DTI) clock reference mode. |

# cable cmcpe-list valid-time

To set the length of time that a CMTS router will consider the current list of CM and CPE devices to be valid, use the **cable cmcpe-list valid-time** command in global configuration mode. To reset the time period to its default value of 3 minutes, use the **no** form of this command.

**cable cmcpe-list valid-time** *time*

**no cable cmcpe-list valid-time**

## Syntax Description

*time* Specifies the time period, in seconds, that the Cisco CMTS router should consider the current CM/CPE list to be valid. In Cisco IOS Release 12.2(15)BC1 and earlier releases, the valid range is 0 to 3600 seconds, with a default value of 180 seconds (3 minutes). In Cisco IOS Release 12.2(15)BC2 and later releases, the valid range is 0 to 86400 seconds, with a default value of 900 seconds (15 minutes).

## Command Default

180 seconds (3 minutes)—Cisco IOS Release 12.2(15)BC1 and earlier releases  
900 seconds (15 minutes)—Cisco IOS Release 12.2(15)BC2 and later releases

## Command Modes

Global configuration (config)

## Command History

| Release                  | Modification                                                                                                             |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 12.0(15)SC1, 12.1(8)EC1, | This command was introduced for the Cisco uBR7100 series and Cisco uBR7200 series routers.                               |
| 12.2(4)BC1               | This command was supported on the 12.2 BC train for the Cisco uBR10012 router.                                           |
| 12.2(15)BC2              | The maximum range for time was expanded from 3600 to 86400 seconds, and the default was changed from 180 to 900 seconds. |
| 12.3BC                   | This command was integrated into Cisco IOS Release 12.3BC.                                                               |
| 12.2(33)SCA              | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.       |

## Usage Guidelines

The Cisco CMTS router maintains an internal list of cable modems and CPE devices that were connected on its cable interfaces in the last 24 hours. This list does not capture cable modems and CPE devices that were connected before the last 24 hours.

The CMTS router uses this list to provide the data for various **show** commands and to respond to SNMP requests that query the entries in the cdxCmCpeTable table in the CISCO-DOCS-EXT-MIB MIB.

By default, the Cisco CMTS router uses the current list if it is less than 3 minutes old. If the current list is older than 3 minutes, the Cisco CMTS router considers it invalid and rebuilds a new list. This prevents the CMTS router from having to build a new list for every query, which could impact system performance.

You can use the **cable cmcpe-list valid-time** command to change the length of time that the CMTS router considers the current CM and CPE device list to be valid. This allows you to find the optimum time value that provides the most current information without affecting the number of CPU cycles that are available for network processing.

A smaller time period ensures that the CM and CPE device list is more current but it requires more processing time to maintain the list. A longer time period reduces the load on the processor but the CM/CPE list might not be current.

If CPU usage dramatically increases when performing SNMP queries of the cdxCmCpeTable table, use this command to increase the valid list time so that the Cisco CMTS router does not have to rebuild the CM/CPE list more often than needed to respond to the queries.

**Note**

To find the current valid list time, use the **show running-config** command and look for the **cable cmcpe-list valid-time** command in the output. If the command does not appear, the valid list time is set for its default value.

**Examples**

The following example shows how to set the valid list time to 60 seconds (1 minute):

```
Router(config)# cable cmcpe-list valid-time 60
```

The following example shows how to find the current valid list time setting:

```
Router# show running-config | include cmcpe-list
cable cmcpe-list valid-time 60
```

**Related Commands**

| Command                 | Description                                                   |
|-------------------------|---------------------------------------------------------------|
| <b>show cable modem</b> | Displays information for the registered and unregistered CMs. |

# cable cm-status

To configure the values of the “Event Holdoff Timer” and “Number of Reports per Event” parameters for the cable modem (CM) status events, use the **cable cm-status** command in global configuration mode. To revert to the default values, use the **no** form of this command.

**cable cm-status** { *all* | *event* } [**holdoff** { *timer* | **default** } | **reports** { *reportvalue* | **default** }]

**no cable cm-status**

## Syntax Description

|                |                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>     | Specifies all CM status events.                                                                                                                                                                                                                                                                                                                                                                     |
| <i>event</i>   | Type of CM status event.                                                                                                                                                                                                                                                                                                                                                                            |
| <b>holdoff</b> | (Optional) Sets the CM status event holdoff timer. The holdoff units are defined in milliseconds. The timer value increments by 20 milliseconds. <ul style="list-style-type: none"> <li><i>timer</i>—Holdoff timer value. The valid range is from 1 to 65535 milliseconds. The default value is 50 milliseconds.</li> <li><b>default</b>—Specifies the default value of 50 milliseconds.</li> </ul> |
| <b>reports</b> | (Optional) Sets the value for the number of reports per event. <ul style="list-style-type: none"> <li><i>reportvalue</i>—Report value. The valid range is from 0 to 255. The default value is 2.</li> <li><b>default</b>—Specifies the default value of 2.</li> </ul>                                                                                                                               |

## Command Default

Default values are used for the “Event Holdoff Timer” and “Number of Reports per Event” parameters.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

The **cable cm-status** command updates the event table for the MAC Domain Descriptor (MDD) belonging to a primary channel. The help text of the command provides a mapping of an event type to the corresponding integer.

The ten CM status events are:

1. Secondary channel MDD time-out
2. QAM/FEC lock failure
3. Sequence out-of-range
4. MDD recovery
5. QAM/FEC lock recovery
6. T4 time-out

7. T3 re-tries exceeded
8. Successful ranging after T3 re-tries exceeded
9. CM operating on battery backup
10. CM returned to A/C power

**Note**

The CM-STATUS message event 'sequence out of range' is enabled and supported on the Cisco Wideband SPA from Cisco IOS Release 12.2(33)SCE5 onwards. When the Cisco CMTS receives the 'sequence out of range' event, it toggles the sequence-change-count (SCC) bit for each of the indicated downstream service identifiers (DSIDs).

**Examples**

The following example shows how to configure an event holdoff timer of 100 milliseconds and four reports per event for all CM-STATUS events:

```
Router# configure terminal
Router(config)# cable cm-status all holdoff 100 reports 4
```

The following example shows how to configure the CM status event "MDD recovery" with an event holdoff timer of 150 milliseconds and three reports for the event:

```
Router# configure terminal
Router(config)# cable cm-status 4 holdoff 150 reports 3
```

**Associated Features**

The **cable cm-status** command is used to configure the following feature:

- [Wideband Modem Resiliency](#)

**Related Commands**

| Command                       | Description                                                                            |
|-------------------------------|----------------------------------------------------------------------------------------|
| <b>cable cm-status enable</b> | Enables a CM status event or a group of CM status events on a primary cable interface. |

# cable cm-status enable

To enable a CM status event or a group of CM status events on a primary cable interface, use the **cable cm-status enable** command in interface configuration mode. To disable a particular event on a primary cable interface, use the **no** form of this command.

**cable cm-status enable** *range*

**no cable cm-status**

## Syntax Description

*range*

Specifies the CM status events you want to enable on a primary cable interface. The valid range is 1 to 10. You can enable a single event by specifying the event number or a group of events by specifying a range (for example, 1-9).

The following events are enabled by default on a cable or modular cable interface:

- Secondary channel MDD time-out
- QAM/FEC lock failure
- Sequence out of range
- MDD recovery
- QAM/FEC lock recovery



### Note

The default events are not displayed in the output of the **show running-config interface cable** command.

## Command Default

The downstream related events such as secondary channel MDD time-out, QAM/FEC lock failure, Sequence out of range, MDD recovery, and QAM/FEC lock recovery are enabled.

## Command Modes

Interface configuration (config-if)

## Command History

### Release

### Modification

12.2(33)SCB

This command was introduced.

## Usage Guidelines

This command applies to all non-primary RF channels on a CMTS.

The ten CM status events per interface are:

1. Secondary channel MDD time-out
2. QAM/FEC lock failure
3. Sequence out of range
4. MDD recovery



5. QAM/FEC lock recovery
6. T4 time-out
7. T3 re-tries exceeded
8. Successful ranging after T3 re-tries exceeded
9. CM operating on battery backup
10. CM returned to A/C power

**Note**

If the **no** version of the command is executed on the interface for specific events, then the **show running-config interface** command lists the events only that are enabled. If no events are enabled then, the **show running interface cable** command displays **no cable cm-status enable** with the events.

**Examples**

The following example shows how to enable all CM status events on a primary cable interface:

```
Router# configure terminal
Router(config)# interface cable 8/0/0
Router(config-if)# cable cm-status enable 1-10
```

The following example shows the **no cable cm-status enable** command being configured and the corresponding example shows **show running-config interface** command output:

```
Router(config)# interface cable 8/0/0
Router(config-if)# cable cm-status enable 1-10
Router(config-if)# no cable cm-status enable 1-2 4-5
Router(config-if) exit
```

```
Router# show running-config interface cable 8/0/0
Building configuration...
```

```
Current configuration : 1557 bytes
!
interface Cable8/0/0
 shutdown
 cable cm-status enable 3 6-10
 no cable packet-cache
 cable default-phy-burst 0
 cable map-advance dynamic 300 500
 cable bundle 1
 cable downstream channel-id 145
```

The following example shows the **show running-config interface cable** command output when no events are enabled on the CMTS:

```
Router#show running-config interface cable 8/0/0
Building configuration...
```

```
Current configuration : 1558 bytes
!
interface Cable8/0/0
 shutdown
 no cable cm-status enable 1-10
 no cable packet-cache
 cable default-phy-burst 0
 cable map-advance dynamic 300 500
 cable bundle 1
 cable downstream channel-id 145
 cable downstream annex B
```

 cable cm-status enable

```
cable downstream modulation 256qam
cable downstream interleave-depth 32
cable downstream frequency 555000000
cable downstream rf-shutdown
cable upstream max-ports 4
no cable upstream 0 connector
cable upstream 0 frequency 40000000
cable upstream 0 channel-width 3200000 3200000
cable upstream 0 power-level 26
cable upstream 0 docsis-mode tdma-atdma
cable upstream 0 minislot-size 4
--More--
```

---

**Related Commands**

| Command                 | Description                                                   |
|-------------------------|---------------------------------------------------------------|
| <b>show cable modem</b> | Displays information for the registered and unregistered CMs. |

---

# cable config-file

To create a configuration filename for a Cisco CMTS router internal CM configuration file, use the **cable config-file** command in global configuration mode. To delete the configuration filename, use the **no** form of this command.

**cable config-file** *filename*

**no cable config-file** *filename*

## Syntax Description

*filename* Specifies the configuration filename to create and edit.

## Command Default

No default behaviors or values

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.1(2)EC1  | This command was introduced.                                                                                       |
| 12.2(4)BC1  | This command was integrated into Cisco IOS Release 12.2(4)BC1.                                                     |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

A DOCSIS CMTS router automatically downloads a DOCSIS configuration file to a CM during its initial registration procedure. The DOCSIS configuration file configures the CM for its network operations and includes information such as the maximum number of CPE devices that are supported, the quality of service (QoS) options provided for the CM, and whether the CM should upgrade to a new software image.

The DOCSIS specification defines the format of the DOCSIS configuration files, which can be created by any number of tools. In addition to the other tools that Cisco provides for this purpose, the **cable config-file** command can be used to create the DOCSIS configuration files needed for your network. These configuration files are stored in the Flash memory on the Cisco CMTS router and can be automatically downloaded to the CM as needed.

The **cable config-file** command creates the DOCSIS configuration file if it does not already exist and then enters config-file configuration mode. You can then give one of the following subcommands to create the configuration file:

- **access-denied**
- **channel-id**
- **cpe max**
- **download**
- **frequency**

- **option**
- **privacy**
- **service-class**
- **snmp manager**
- **timestamp**

**Note**

When a DOCSIS shared secret is configured on the downstream interface (see the **cable shared-secret** command), the **cable config-file** command automatically inserts the appropriate MD5 Message Integrity Check (MIC) value at the end of the dynamically generated DOCSIS configuration file. You do not need to specify the DOCSIS shared secret string with the **cable config-file** command.

After using the **cable config-file** subcommands, enter the **exit** command to leave config-file mode and to save the configuration file in the Flash memory. After a configuration file is created, it also appears in the running-configuration file. To delete a configuration file and remove it from Flash memory, use the **no cable config-file** command.

To allow CMs to download the configuration files, you must also enable the router's onboard TFTP server, using the **tftp-server** configuration command. Unless you are running on a small lab network, you should also remove the default limit of 10 TFTP sessions by using the **service udp-small-serves max-servers no limit** command.

In addition, the following commands are also recommended:

- **cable time-server**—Enables the Cisco CMTS router to function as a time-of-day (ToD) server.
- **ip dhcp pool**—Configures the Cisco CMTS router as a DHCP server. Otherwise, you need an external DHCP server.
- **ip dhcp ping packets 0**—Improves the scalability of the Cisco CMTS router DHCP server.

**Note**

For complete information on DOCSIS configuration files, see Appendix C in the DOCSIS 1.1 Radio Frequency (RF) Interface Specification, available on the DOCSIS Cable Labs official web site at <http://www.cablemodem.com>

**Examples**

The following example shows two DOCSIS configuration files being configured. The first configuration file allows each CM to have up to four CPE devices and configures the QoS parameters for its traffic. The second configuration file denies network access to the CM and its CPE devices.

```
Router# configure terminal
Router(config)# cable config-file test.cm
Router(config-file)# cpe max 4
Router(config-file)# service-class 1 priority 2
Router(config-file)# service-class 1 max-upstream 128
Router(config-file)# service-class 1 max-downstream 1000
Router(config-file)# timestamp
Router(config-file)# exit
Router(config)# cable config-file denied.cm
Router(config-file)# access-denied
Router(config-file)# exit
Router(config)#
```

The following is a portion of a typical Cisco IOS configuration file that shows the above two DOCSIS configuration files, as well as a typical DHCP server configuration:

```

Router# show running-config
...
service udp-small-servers max-servers no-limit
!
cable time-server
!
cable config-file test.cm
 cpe max 4
 service-class 1 priority 2
 service-class 1 max-upstream 128
 service-class 1 max-downstream 1000
 timestamp
cable config-file disable.cm
 access-denied
!
ip dhcp pool modems-c3
 network 10.30.128.0 255.255.240.0
 bootfile test.cm
 next-server 10.30.128.1
 default-router 10.30.128.1
 option 7 ip 10.30.128.1
 option 4 ip 10.30.128.1
 option 2 hex 0000.0000
!
...

```

**Related Commands**

| Command                        | Description                                                                                                                    |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>cable config-file</b>       | Creates a DOCSIS configuration file and enters configuration file mode.                                                        |
| <b>access-denied</b>           | Disables access to the network.                                                                                                |
| <b>channel-id</b>              | Specifies upstream channel ID.                                                                                                 |
| <b>cpe max</b>                 | Specifies the maximum number of CPE devices allowed access.                                                                    |
| <b>debug cable config-file</b> | Displays information about the DOCSIS configuration files that are generated by the internal DOCSIS configuration file editor. |
| <b>download</b>                | Specifies the filename and server IP address for downloading a new software image.                                             |
| <b>frequency</b>               | Specifies the downstream frequency.                                                                                            |
| <b>option</b>                  | Specifies options for the configuration file that are not provided for by the other commands.                                  |
| <b>privacy</b>                 | Specifies privacy options for baseline privacy images.                                                                         |
| <b>service-class</b>           | Specifies service class definitions for the configuration file.                                                                |
| <b>snmp manager</b>            | Specifies Simple Network Management Protocol (SNMP) options.                                                                   |
| <b>timestamp</b>               | Enables time-stamp generation.                                                                                                 |
| <b>show running-config</b>     | Displays the current run-time configuration, which includes any configuration files that have been defined.                    |
| <b>show startup-config</b>     | Displays the current saved configuration, which includes any configuration files that have been defined and saved.             |

■ cable config-file



## Cable Commands: cable d

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Revised: August 12, 2013, OL-15510-17

### New Commands

| Command                                                    | Cisco IOS Software Release |
|------------------------------------------------------------|----------------------------|
| <b>cable dynamic-bw-sharing</b>                            | 12.3(23)BC1                |
| <b>cable divert-rate-limit</b>                             | 12.2(33)SCB                |
| <b>cable docsis30-voice downstream<br/>req-attr-mask</b>   | 12.2(33)SCB                |
| <b>cable downstream attribute mask</b>                     | 12.2(33)SCB                |
| <b>cable dsg tg</b>                                        | 12.2(33)SCB4               |
| <b>cable downstream qos wfq weight</b>                     | 12.2(33)SCC                |
| <b>cable dynamic-secret tftp<br/>insert-upgrade-server</b> | 12.2(33)SCD2               |
| <b>cable downstream channel-id automatic</b>               | 12.2(33)SCE                |
| <b>cable dfo-retry-count</b>                               | 12.2(33)SCD7               |
| <b>cable dynamic-qos trace</b>                             | 12.2(33)SCF                |
| <b>cable downstream dsg disable</b>                        | 12.2(33)SCG                |
| <b>cable downstream dsg tg</b>                             | 12.2(33)SCG                |
| <b>cable dsg name-update-interval</b>                      | 12.2(33)SCG                |
| <b>cable dsg tg default-priority</b>                       | 12.2(33)SCG                |
| <b>cable dsg tg priority</b>                               | 12.2(33)SCG                |
| <b>cable ds-resiliency</b>                                 | 12.2(33)SCG                |



### Modified Commands

| Modified Command                   | Effective Cisco IOS Release |
|------------------------------------|-----------------------------|
| <b>cable ds-max-burst</b>          | 12.2(33)SCB                 |
| <b>cable dynamic-bw-sharing</b>    | 12.2(33)SCB                 |
| <b>cable dsg tunnel srv-class</b>  | 12.2(33)SCC1                |
| <b>cable downstream rf-power</b>   | 12.2(33)SCC4                |
| <b>cable dhcp-giaddr</b>           | 12.2(33)SCD5                |
| <b>cable dsg cfr</b>               | 12.2(33)SCD5                |
| <b>cable dsg cfr</b>               | 12.2(33)SCG                 |
| <b>cable dsg tg</b>                | 12.2(33)SCG                 |
| <b>cable downstream rate-limit</b> | 12.2(33)SCF                 |

### Obsolete Commands

The following commands have been removed from certain Cisco IOS software releases:

| Obsolete Command                 | Effective Cisco IOS Release |
|----------------------------------|-----------------------------|
| <b>cable downstream dsg rule</b> | 12.3(17a)BC2                |
| <b>cable dsg</b>                 | 12.3(13a)BC                 |
| <b>cable dsg keepalive</b>       | 12.3(13a)BC                 |



# cable dci-response

To configure how a cable interface responds to DCI-REQ messages for CMs on that interface, use the **cable dci-response** command in cable interface configuration mode.

**cable dci-response** [**success** | **ignore** | **reject permanent** | **reject temporary**]

| Syntax Description      |            |                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>success</b>          | (Optional) | Configures the interface so that the Cisco CMTS responds to DCI-REQ messages from CMs on the interface by sending a DCI-RSP response with the confirmation code of Success (0).                                                                                                                                                                                                                    |
| <b>ignore</b>           | (Optional) | Configures the interface so that the Cisco CMTS ignores DCI-REQ messages from CMs on the interface. It does not send any DCI-RSP responses.                                                                                                                                                                                                                                                        |
| <b>reject permanent</b> | (Optional) | Configures the interface so that the Cisco CMTS responds to DCI-REQ messages from CMs on the interface by sending a DCI-RSP response with the confirmation code of Reject Permanent (4).                                                                                                                                                                                                           |
| <b>reject temporary</b> | (Optional) | Configures the interface so that the Cisco CMTS ignores the first four DCI-REQ messages from a CM on the interface, but on the fifth DCI-REQ message, the CMTS responds with a DCI-RSP response with the confirmation code of Reject Temporary (3). The CMTS then continues to ignore the next seven DCI-REQ messages and then restarts this process when it receives the twelfth DCI-REQ message. |

**Command Default** The Cisco CMTS router responds to DCI-REQ messages from all CMs by sending a DCI-RSP response with the confirmation code of Success (0).

**Command Modes** Interface configuration—cable interface only (config-if)

| Command History | Release     | Description                                                                                                        |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(4)CX   | This command was introduced for DOCSIS 1.1 operation.                                                              |
|                 | 12.2(4)BC1  | This command was integrated into Cisco IOS Release 12.2(4)BC1.                                                     |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** The Device Class Identification (DCI) messages are part of the Media Access Control Specification section of the DOCSIS 1.1 specification (revision SP-RF1v1.1-I05-000714 and above). A CM can optionally use the DCI-REQ message to inform the CMTS router of certain capabilities, such as whether it is a CPE-controlled cable modem (CCCM).

The CMTS router then responds with one of the following confirmation codes:

- Success—Allows the CM to continue with the registration process.

- **Reject Permanent**—Instructs the CM to abort its registration process on this downstream channel. The CM must try all other available downstream channels before attempting to register on this downstream channel again.
- **Reject Temporary**—Instructs the CM to reset its DCI-REQ counter, to send another DCI-REQ message, and to wait for the DCI-RSP before proceeding with the registration process.

**Note**

The CMTS router also can respond with an Upstream Transmitter Disable (UP-DIS) message. See the description of the **cable dci-upstream-disable** command for details.

**Examples**

The following example shows how to configure the CMTS router so that it ignores all DCI-REQ messages from CMs on the cable interface at slot 6:

```
Router# configure terminal
Router(config)# interface c6/0
Router(config-if)# cable dci-response ignore
```

The following example shows how to configure the CMTS router so that it returns to its default behavior for the cable interface on slot 6, which is to respond to all DCI-REQ messages from CMs by sending a DCI-RSP with a Success confirmation code:

```
Router# configure terminal
Router(config)# interface c6/0
Router(config-if)# cable dci-response success
```

**Note**

The **cable dci-response success** command does not appear in a startup or running configuration file, because it is the default configuration for a cable interface.

**Related Commands**

| Command                           | Description                                                                                                                                           |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable dci-upstream-disable</b> | Configures the cable interface so that it transmits an Upstream Transmitter Disable (UP-DIS) message instead of a DCI-RSP message to a particular CM. |
| <b>debug cable dci</b>            | Enables debugging of DCI-REQ, DCI-RSP, and UP-DIS messages.                                                                                           |

# cable dci-upstream-disable

To configure a cable interface so that it transmits a DOCSIS 1.1 Upstream Transmitter Disable (UP-DIS) message to a particular CM, use the **cable dci-upstream-disable** command in cable interface configuration mode. To remove that configuration and return to the default configuration, use the **no** form of this command.

**cable dci-upstream-disable** *mac-address* [**enable** | **disable**]

**no cable dci-upstream-disable** *mac-address* [**enable** | **disable**]

## Syntax Description

|                    |                                                                                                                                                                   |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>mac-address</i> | Specifies the MAC physical layer address for a particular CM.                                                                                                     |
| <b>enable</b>      | (Optional) Enables the UP-DIS message for the particular CM, so that when the CM sends a DCI-REQ message, the CMTS router responds by sending an UP-DIS response. |
| <b>disable</b>     | (Optional) Disables the sending of UP-DIS messages to a particular CM.                                                                                            |

## Command Default

The Cisco CMTS router does not transmit UP-DIS messages to any CMs.

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release     | Description                                                                                                        |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX   | This command was introduced for DOCSIS 1.1 operation.                                                              |
| 12.2(4)BC1  | This command was integrated into Cisco IOS Release 12.2(4)BC1.                                                     |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The DOCSIS 1.1 specification (revision SP-RFIV1.1-I05-000714 and above) allows a CMTS router to transmit an Upstream Transmitter Disable (UP-DIS) message to a CM. If the CM supports the UP-DIS message, it responds by immediately disabling its upstream transmitter circuitry. The CM must be power-cycled before it can begin transmitting on the upstream again.

## Examples

The following example shows the **cable dci-upstream-disable** command being used to enable the UP-DIS message for the CM with the MAC address of 0123.4567.89ab.

```
Router# configure terminal
Router(config)# interface c6/0
Router(config-if)# cable dci-upstream-disable 0123.4567.89ab enable
Router(config-if)# exit
Router(config)# exit
```

| Related Commands | Command                   | Description                                                                                 |
|------------------|---------------------------|---------------------------------------------------------------------------------------------|
|                  | <b>cable dci-response</b> | Configures how the cable interface responds to DCI-REQ messages from CMs on that interface. |
|                  | <b>debug cable dci</b>    | Enables debugging of DCI-REQ, DCI-RSP, and UP-DIS messages.                                 |

# cable default-phy-burst

To specify a value for the upstream Maximum Traffic Burst parameter for CMs that do not specify their own value, use the **cable default-phy-burst** command in cable interface configuration mode. To reset the maximum burst size to its default, use the **no** form of this command.

**cable default-phy-burst** *burst-size*

**no cable default-phy-burst**

## Syntax Description

*burst-size* Specifies the maximum number of bytes that are allowed in a burst. The valid range is 0 to 4096 bytes, with a default of 2000 bytes. A value of 0 specifies that CMs cannot register unless they specify a valid burst size.

## Command Default

2000 bytes

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release     | Modification                                                                                                                                                                                                                                                                                                         |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(8)BC1  | This command was introduced for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers.                                                                                                                                                                                                          |
| 12.2(15)BC2 | The <b>cable upstream fragment-force</b> command is introduced, with considerations to the <b>cable default-phy-burst</b> command.<br><br>The maximum upstream traffic burst may also be influenced by the new <b>cable upstream fragment-force</b> command for cable modems that are able to perform fragmentation. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                                                                                                           |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                   |

## Usage Guidelines



### Note

The **cable default-phy-burst** command applies to cable modems that cannot perform fragmentation. The value specified by the **cable default-phy-burst** command is used to determine the maximum total frame burst size supported for a cable modem request. In contrast, the **cable upstream fragment-force** command may be used to determine the largest single physical burst a cable modem can transmit, when the cable modem supports fragmentation.

The DOCSIS 1.0 specification allows CMs to register without specifying a maximum upstream burst size, or to register with a value of 0, which means an unlimited burst size. This behavior can interfere with DOCSIS 1.1 networks because excessively large bursts on an upstream will generate unpredictable jitter and delay in voice calls. DOCSIS 1.1 CMs can also cause this problem if they register without enabling fragmentation of packets at the DOCSIS MAC layer.

This command allows you to specify a default burst size for CMs that register without specifying a burst size or that register with a burst size of 0. It also specifies the maximum size of long data grants if a CM specifies a size of 0 (unlimited) in the Upstream Channel Descriptor (UCD) packet. If a CM specifies a long data grant that would exceed the maximum burst size, and the CM is not using DOCSIS concatenation, the DOCSIS scheduler drops the bandwidth request.

To prevent CMs from registering without defining a burst profile, use this command with a *burst-size* of zero. CMs that do not define a burst profile will not be allowed to register and come online.

**Note**

Typically, DOCSIS 1.1 CMs set the maximum upstream transmit burst size to the larger value of 1522 bytes and maximum concatenated burst size (which can be a maximum of 4096 bytes).

The default PHY burst parameter interacts with two other parameters that are configured in the DOCSIS configuration file:

- DOCSIS 1.1 configuration files can also specify a value for the maximum concatenation burst, which has a default of 1522 bytes. If this parameter is greater than the default PHY burst size, the CM can override the default PHY burst when it is using concatenation.
- DOCSIS 1.0 and 1.1 configuration files can also specify a maximum transmit burst size. In DOCSIS 1.1 configurations, this parameter defaults to 3044 bytes, with a minimum of 1522 bytes. DOCSIS 1.0 configuration files could set this parameter to a value lower than 1522 bytes, depending on what version of the DOCSIS 1.0 specification they support. The CMTS router will enforce the lower limit between the default phy burst and the maximum transmit burst, so you should ensure that all configuration files in your network specify a minimum of 1522 bytes for the maximum transmit burst size.

**Examples**

The following example shows the default maximum burst size to 1522 bytes, which is the minimum size required by the DOCSIS 1.1 specification:

```
Router(config)# interface cable 5/1
Router(config-if)# cable default-phy-burst 1522
```

The following example shows the default maximum burst size to 0, which means that a CM must specify a valid burst profile before the Cisco CMTS allows it to register and come online:

```
Router(config)# interface cable 5/1
Router(config-if)# cable default-phy-burst 0
```

The following example shows the default maximum burst size being reset to its default of 2000 bytes:

```
Router(config)# interface cable 5/1
Router(config-if)# no cable default-phy-burst
```

**Related Commands**

| Command                              | Description                                                                                                                       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>cable upstream fragmentation</b>  | Enables fragmentation of DOCSIS frames on a particular upstream.                                                                  |
| <b>cable upstream fragment-force</b> | Specifies that a cable interface line card should fragment DOCSIS frames on an upstream when the frame exceeds a particular size. |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs, including the QoS configuration for individual CMs.                 |
| <b>show controllers cable</b>        | Displays the downstream MPEG framing format (Annex A or Annex B) setting.                                                         |

# cable device

To configure an access list for a cable modem (CM) device or host on the Cisco CMTS router, use the **cable device** command in privileged EXEC mode. To remove an access group, use the **no access-group** option of this command.

```
cable device {ip-address | mac-address} [no] access-group {access-list | access-name} |
{[vrf vrf-name] ip-address [no] access-group [access-list | access-name]}
```

|                           |                                             |                                                                                                                      |
|---------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>ip-address</i>                           | IP address of the CM device or host.                                                                                 |
|                           | <i>mac-address</i>                          | MAC address of the CM device or host.                                                                                |
|                           | <b>access-group</b>                         | Enables <b>access-group</b> options. The <b>no</b> form removes access-group specifications.                         |
|                           | { <i>access-list</i>   <i>access-name</i> } | Specifies the IP access list (standard or extended), either by access-list number (1 to 199) or by access-list name. |
|                           | <b>vrf</b> <i>vrf-name</i>                  | Specifies a virtual routing and forwarding (VRF) instance that is populated with VPN routes.                         |
|                           | <i>vrf-name</i>                             | <i>vrf-name</i> —Name of the VRF instance                                                                            |

**Command Default** None

**Command Modes** Privileged EXEC (#)

| <b>Command History</b> | <b>Release</b> | <b>Description</b>                                                                                                 |
|------------------------|----------------|--------------------------------------------------------------------------------------------------------------------|
|                        | 12.1           | This command was moved from earlier releases.                                                                      |
|                        | 12.1(1a)T1     | The <b>vrf</b> keyword was added for Multiprotocol Label Switching (MPLS) VPN support.                             |
|                        | 12.3BC         | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** For the **vrf** keyword of this command, only the *ip-address* option is supported.

An access list can be configured to deny access to any IP address other than the ones previously configured, using the **access-list** *access-list* **deny any any** command. Starting with Cisco IOS Release 12.2(33)SCD, when a CM is added to such an access list on the Cisco uBR7200 series universal broadband routers, the ping fails. If the CM is reset, removed, or powered off, the ping succeeds after the CM comes online. However, the **show cable modem access-group** command displays that the CM does not belong to the access-group.



**Note**

The **cable device** command is not supported on the Cisco uBR10012 universal broadband router.

**Note**

The **vrf** keyword is not supported in Cisco IOS Releases 12.0 SC, 12.1 EC, and 12.2 BC.

**Examples**

The following example shows how to assign an access list to the MAC address of a cable device:

```
Router# configure terminal
Router(config)# cable device 0010.7b6b.77ed acc 1
Router(config)# exit
```

**Related Commands**

| Command                               | Description                                                                    |
|---------------------------------------|--------------------------------------------------------------------------------|
| <b>clear cable host</b>               | Clears the host from the internal address tables of the Cisco CMTS router.     |
| <b>cable host access-group</b>        | Configures the access list for the specified hosts on the Cisco CMTS router.   |
| <b>show cable device access-group</b> | Displays CMs and hosts behind the CMs on the network on the Cisco CMTS router. |
| <b>show cable host access-group</b>   | Displays hosts behind the CMs on the network on the Cisco CMTS router.         |



# cable dfo-retry-count

To configure the Downstream Frequency Override (DFO) retry count, use the **cable dfo-retry-count** command in global configuration mode. To reset the DFO retry count to its default value, use the **no** form of this command.

**cable dfo-retry-count** *n*

**no cable dfo-retry-count** *n*

|                           |          |                                                                              |
|---------------------------|----------|------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i> | Downstream frequency override retry count. The valid range is from 1 to 100. |
|---------------------------|----------|------------------------------------------------------------------------------|

|                        |                                                                                    |
|------------------------|------------------------------------------------------------------------------------|
| <b>Command Default</b> | The <b>cable dfo-retry-count</b> command is configured with a default value of 20. |
|------------------------|------------------------------------------------------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCD7   | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The Downstream Frequency Override (DFO) feature enables cable modems to register on a specific primary RF channel. Because of RF failure conditions and some cable modem types, the cable modem takes more time to register on a specific primary RF channel. You can configure the DFO retry count to reduce the cable modem registration time using the <b>cable dfo-retry-count</b> command. |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                         |
|-----------------|-------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to configure the DFO retry count as 10: |
|-----------------|-------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# cable dfo-retry-count 10
```

| <b>Related Commands</b> | <b>Command</b>                                                                | <b>Description</b>                                                                                      |
|-------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|                         | <b>cable service attribute ds-bonded downstream-type bonding-enabled</b>      | Forces a downstream bonding-capable modem to initialize on a bonded primary-capable downstream channel. |
|                         | <b>cable service attribute non-ds-bonded downstream-type bonding-disabled</b> | Forces the non-bonding-capable modems to register only on non-bonded RF channels on the CMTS.           |
|                         | <b>cable service type ds-frequency</b>                                        | Redirects matching service types to the downstream frequency.                                           |

# cable dhcp-giaddr

To modify the GIADDR field for the DHCPDISCOVER and DHCPREQUEST packets with a relay IP address before they are forwarded to the DHCP server, use the **cable dhcp-giaddr** command in cable interface or subinterface configuration mode. To set the GIADDR field to its default, use the **no** form of this command.

**cable dhcp-giaddr** { **policy** [**strict** | **host** | **mta** | **ps** | **stb**] *giaddr* | **primary** }

**no cable dhcp-giaddr**

## Syntax Description

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>policy</b>  | Selects the control policy, so that the primary address is used for cable modems and the secondary addresses are used for hosts and other customer premises equipment (CPE) devices. This setting is typically used when the CMs on the interface are configured for routing, so that the CMs and hosts can use IP addresses on different subnets.                                                                                                                                                                                                                       |
| <b>strict</b>  | (Optional, only when the <b>policy</b> keyword is specified) Selects the GIADDR IP address as the source IP address in the forwarded DHCP OFFER packet.<br><br>By default when using the <b>policy</b> option, the Cisco CMTS changes the source IP address in the DHCP OFFER packet to match that of the primary address on the cable interface. Enable the <b>strict</b> option to prevent this behavior, which could interfere with any access lists applied to the CM when the CM is using a different subnet from the primary address space of the cable interface. |
| <b>host</b>    | Specifies the GIADDR for hosts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>mta</b>     | Specifies the GIADDR for media terminal adapters (MTA).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>ps</b>      | Specifies the GIADDR for portal servers (PS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>stb</b>     | Specifies the GIADDR for set-top boxes (STB).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>giaddr</i>  | IP addresses of the secondary interface of the bundle interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>primary</b> | Selects the primary address always to be used for the GIADDR field for both CMs and CPE devices. This option is typically used for the Cisco uBR-MC16E card and Cisco uBR7100E series routers to support EuroDOCSIS operations.                                                                                                                                                                                                                                                                                                                                          |

## Command Default

None

## Command Modes

Interface configuration (config-if)  
Subinterface configuration (config-subif)

## Command History

| Release     | Modification                                                   |
|-------------|----------------------------------------------------------------|
| 12.0(4)T    | This command was introduced.                                   |
| 12.0(6)SC   | This command was integrated into Cisco IOS Release 12.0(6)SC.  |
| 12.1(2)EC1  | This command was integrated into Cisco IOS Release 12.1(2)EC1. |
| 12.1(3a)EC  | This command was modified to support subinterfaces.            |
| 12.2(15)BC2 | This command was modified to include the <b>strict</b> option. |

| Release      | Modification                                                                                                                      |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 12.3BC       | This command was integrated into Cisco IOS Release 12.3BC.                                                                        |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. This command was modified to support the Cisco uBR7225VXR router. |
| 12.2(33)SCD5 | This command was modified to support the <b>host</b> , <b>mta</b> , <b>ps</b> , and <b>stb</b> keywords.                          |

### Usage Guidelines

You can use this command to modify the GIADDR field of DHCPDISCOVER and DHCPREQUEST packets to provide a relay IP address before packets are forwarded to the DHCP servers. Use this command to set a policy option such that primary addresses are used for CMs and secondary addresses are used for hosts (such as PCs) behind the CMs.

When using multiple secondary subnets, the Cisco CMTS router uses the first secondary IP address as the GIADDR field when forwarding a DHCPDISCOVER request to the DHCP server. If no DHCP server responds with a DHCPOFFER message after three attempts, the Cisco CMTS router uses the next secondary IP address, up to a maximum of 16 secondary addresses.



#### Note

If you have configured a Cisco CM for routing mode and are also using the **cable-modem dhcp-proxy nat** command on the CM, you must configure the corresponding cable interface on the Cisco CMTS with the **cable dhcp-giaddr policy [strict]** command.



#### Caution

You cannot use the **strict** option with the internal DHCP server that is onboard the Cisco CMTS router, because the **strict** option requires the use of DHCP relay operation, which is not performed by DHCP termination points such as the internal DHCP server.

### Examples

The following example shows how to set the primary address to be used always for GIADDR:

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable dhcp-giaddr primary
```

The following example shows how to set the primary address to be used always for GIADDR in the cable subinterface mode:

```
Router# configure terminal
Router(config)# interface cable 6/0.1
Router(config-subif)# cable dhcp-giaddr primary
```

The following example shows how to configure the router so that the primary address is used for CMs and the secondary addresses are used for hosts. In addition, the GIADDR is used as the source IP address in forwarded DHCPOFFER packets.

```
Router# configure terminal
Router(config)# interface cable 5/1/0
Router(config-if)# cable dhcp-giaddr policy strict
```

The following example shows how to configure the router so that the CPE device (in this case, the MTA) uses a specific secondary interface:

```
Router# configure terminal
Router(config)# interface bundle 25
Router(config-if)# cable dhcp-giaddr mta 172.10.10.1
```

## Related Commands

| Command                                         | Description                                                                                                                             |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable helper-address</b>                     | Specifies a destination IP address for the User Datagram Protocol (UDP) broadcast (DHCP) packets.                                       |
| <b>cable relay-agent-option</b>                 | Enables the system to insert the CM MAC address into a DHCP packet received from a CM or host, and forward the packet to a DHCP server. |
| <b>cable source-verify</b>                      | Enables CM upstream verification.                                                                                                       |
| <b>cable telco-return spd dhcp-authenticate</b> | Enforces the telco-return CM to use a specific DHCP server.                                                                             |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the Dynamic Host Configuration Protocol (DHCP) server that the telco-return CM must access.                |
| <b>debug cable dhcp</b>                         | Enables debugging of the DHCP when it is used on the cable interface.                                                                   |
| <b>debug cable mac-address</b>                  | Enables debugging of the MAC address on the cable interface.                                                                            |
| <b>ip dhcp relay information option</b>         | Enables the system to insert the CM MAC address into a DHCP packet received from a CM or host and forward the packet to a DHCP server.  |
| <b>ip dhcp smart-relay</b>                      | Monitors client retransmissions when address pool depletion occurs.                                                                     |

# cable dhcp-insert

To configure the Cisco CMTS router to insert descriptors into DHCP packets using option 82, use the **cable dhcp-insert** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable dhcp-insert** { **downstream-description** | **hostname** | **service-class** | **upstream-description** }

## Syntax Description

|                               |                                                                 |
|-------------------------------|-----------------------------------------------------------------|
| <b>downstream-description</b> | Appends received DHCP packets with downstream port descriptors. |
| <b>hostname</b>               | Appends received DHCP packets with router host names.           |
| <b>service-class</b>          | Appends received DHCP packets with router service class.        |
| <b>upstream-description</b>   | Appends received DHCP packets with upstream port descriptors.   |

## Defaults

This configuration is disabled by default.

## Command Modes

Interface configuration (config-if)

## Command History

| Release      | Modification                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC   | This command was introduced.                                                                                       |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCF2 | This command was modified. The <b>service-class</b> keyword was added.                                             |

## Usage Guidelines

This feature enhances the DHCP security potential and the Cable Duplicate MAC Address Feature on the Cisco CMTS router.

The **cable dhcp-insert** command specifies which descriptors to append to DHCP packets. The DHCP servers can then detect cable modem clones and extract geographical information.



### Note

Multiple types of descriptor strings can be configured as long as the maximum relay information option size is not exceeded.

The Cisco CMTS router can use the DHCP Relay Agent Information option (DHCP option 82) to send particular information about a cable modem, such as its MAC address and the cable interface to which it is connected. If the DHCP server cannot match the information with that belonging to a cable modem in its database, the Cisco CMTS router identifies that the device is a CPE device. This allows the Cisco CMTS router and DHCP server to retain accurate information about which CPE devices are using which cable modems and whether the devices should be allowed network access.

The DHCP Relay Agent can also be used to identify cloned modems or gather geographical information for E911 and other applications. Using the **cable dhcp-insert** command, configure the Cisco CMTS router to insert downstream, upstream, hostname, or service class descriptors into DHCP packets. A DHCP server can utilize such information to determine service levels available to the host specific to the provisioned subscriber.

**Note**

To use the **service-class** option, the service class name specified in the CM configuration file must be configured on the Cisco CMTS. The **ip dhcp relay information option-insert** command should be configured on the bundle interface to insert the **service-class** option into the DHCP DISCOVER messages.

**Examples**

The following example shows how to insert descriptors into DHCP packets. The DHCP server can then use these descriptors to identify cable modem clones and extract geographical information.

```
Router(dhcp-config)# cable dhcp-insert service-class
```

**Associated Features**

The **cable dhcp-insert** command is used to configure the following feature:

[DHCP, ToD, and TFTP Services for the CMTS Routers](#)

**Related Commands**

| Command                                        | Description                                                                                                |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>ip dhcp relay information option-insert</b> | Enables the system to insert a DHCP Relay Agent option in forwarded BOOTREQUEST messages to a DHCP server. |

# cable dhcp-parse option

To enable parsing of Dynamic Host Configuration Protocol (DHCP) options, use the **cable dhcp-parse option** command in cable interface configuration mode. To disable parsing, use the **no** form of this command.

**cable dhcp-parse option-optnum**

**no cable dhcp-parse option-optnum**

## Syntax Description

|                |                                                        |
|----------------|--------------------------------------------------------|
| <i>-optnum</i> | Specifies the DHCP option. Valid values are 43 and 60. |
|----------------|--------------------------------------------------------|

## Command Default

The CMTS does not parse the specified DHCP options.

## Command Modes

Cable interface configuration (config-if)

## Command History

| Release    | Modification                 |
|------------|------------------------------|
| 12.3(21)BC | This command was introduced. |

## Usage Guidelines

To determine specific device and system information, configure cable **dhcp-parse option-43** command on the CMTS. The CMTS parses option-43 of the CPE DHCP message to determine the device and system information of the CPE.

To determine the CPE device type, configure **cable dhcp-parse option-60** command on the CMTS. The CMTS parses option-60 of the CPE DHCP message to determine the device type of the CPE.

## Examples

The following example shows DHCP option 43 enabled on the CMTS:

```
Router(config-if)# cable dhcp-parse option-43
Router(config-if)#
```

## Related Commands

| Command                     | Description                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>cable helper address</b> | Specifies a destination IP address for User Datagram Protocol (UDP) broadcast Dynamic Host Configuration Protocol (DHCP) packets. |

# cable divert-rate-limit

To set Cable-side DRL rate and limit, use the **cable divert-rate-limit** command in interface configuration mode. To reset the *rate* and *limit* to the default values, use the **no** form of this command.

**cable divert-rate-limit** *rate* **limit** *limit*

**no cable divert-rate-limit**

|                           |              |                                                                                                                                                                              |
|---------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>rate</i>  | Specifies the divert rate in packets per second. Minimum rate is 1 packet per second. Maximum rate is 65535 packets per second. The default rate is 2000 packets per second. |
|                           | <i>limit</i> | Specifies the number of packets to be diverted in an initial burst of packets. Minimum limit is 4 packets. Maximum limit is 4194 packets. The default limit is 2000 packets. |

|                        |                                                                                                                                   |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | The default DRL configuration for every physical cable interface is 2000 packets per second and the default limit is 2000 packets |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

|                      |                                                          |
|----------------------|----------------------------------------------------------|
| <b>Command Modes</b> | Interface configuration—cable interface only (config-if) |
|----------------------|----------------------------------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCB    | This command was introduced. |

|                         |                                                                                                                    |
|-------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Cable-side DRL is configured on the physical cable interface. It cannot be configured on a cable bundle interface. |
|-------------------------|--------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                |
|-----------------|------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to configure the rate and limit values for a cable interface.: |
|-----------------|------------------------------------------------------------------------------------------------|

```
Router(config-if)# cable divert-rate-limit rate 1 limit 4
```

| <b>Related Commands</b> | <b>Command</b>                          | <b>Description</b>                                                         |
|-------------------------|-----------------------------------------|----------------------------------------------------------------------------|
|                         | <b>service divert-rate-limit ip</b>     | This command configures DRL rate and limit for WAN-side IP packet streams. |
|                         | <b>service divert-rate-limit non-ip</b> | This command configures DRL for WAN-side non-IP packet streams.            |



# cable docsis30-voice downstream req-attr-mask

To configure downstream DOCSIS 3.0 QoS parameters of the required attribute-mask and forbidden attribute-mask number for all DS voice flows, use the **cable docsis30-voice downstream req-attr-mask** command in global configuration mode. To disable the required attribute-mask and forbidden attribute-mask number, use the **no** form of this command.

**cable docsis30-voice downstream req-attr-mask** *req-attr-mask* **forb-attr-mask** *forb-attr-mask*  
**no cable docsis30-voice**

|                    |                       |                                                                                                                                                                                       |
|--------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>req-attr-mask</i>  | Specifies the required attribute-mask value.<br>Example: 0<br>It can also include HEX format.<br>Example:<br>cable docsis30-voice downstream req-attr-mask FF forb-attr-mask 8000AAbb |
|                    | <i>forb-attr-mask</i> | Specifies the forbidden attribute-mask value.<br>Example: 80000000                                                                                                                    |

|                 |                                                                                                                                                                                                                                |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command Default | The default config is req-attr-mask 0 forb-attr-mask 0. Use the <b>no</b> form of this command to return to default. It will set the values for <b>docsis30 voice downstream req-attr-mask</b> and <b>forb-attr-mask</b> to 0. |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

|                  |                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command is used to configure docsis 3.0 voice related downstream service-flow attribute-mask number. |
|------------------|-----------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to configure the downstream attribute mask for the interface cable:</p> <pre>Router# configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)# cable docsis30-voice downstream req-attr-mask ? &lt;0-FFFFFFF&gt; The attribute bitmap in hex  Router(config)# cable docsis30-voice downstream req-attr-mask aa00 ? forb-attr-mask SF Forbidden Attribute Mask  Router(config)# cable docsis30-voice downstream req-attr-mask aa00 forb-attr-mask ? &lt;0-FFFFFFF&gt; The attribute bitmap in hex</pre> |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router(config)# cable docsis30-voice downstream req-attr-mask aa00 forb-attr-mask bbcc
Router(config)# do show run | include docsis30
cable docsis30-voice downstream req-attr-mask AA00 forb-attr-mask BBCC
```

```
Router(config)# no cable docsis30-voice down
Router(config)# no cable docsis30-voice
Router(config)# do show run | include docsis30
```

---

**Related Commands**

| Command                                | Description                                                                                                                                           |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable downstream attribute-mask</b> | This command enables attribute-based forwarding which allows CMTS to choose bonding group or individual channel for unicast and multicast forwarding. |

---

# cable dot1q-vc-map

To map a cable modem to a particular Virtual Local Area Network (VLAN) on a local outbound Ethernet interface, use the **cable dot1q-vc-map** command in global configuration mode. To remove this mapping, or to remove a particular customer's name from the internal tables, use the **no** form of this command.

**cable dot1q-vc-map** *mac-address ethernet-interface vlan-id* [*cust-name*]

**no cable dot1q-vc-map** *mac-address*

**no cable dot1q-vc-map customer** *cust-name*

| Syntax Description               |  |                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>mac-address</i>               |  | Specifies the hardware (MAC) address for the cable modem whose traffic is to be mapped.                                                                                                                                                                                                                                                                                                                    |
| <i>ethernet-interface</i>        |  | Specifies the outbound interface to which this cable modem should be mapped. On the Cisco uBR7100 series and Cisco uBR7246VXR routers, you can specify an Ethernet, Fast Ethernet, or Gigabit Ethernet interface, depending on what interfaces are actually installed in the chassis.                                                                                                                      |
| <i>vlan-id</i>                   |  | Specifies the ID for the IEEE 802.1Q Virtual Local Area Network (VLAN) that should be used to tag the frames for this cable modem. The valid range is 1 to 4095, with no default.<br><br><b>Note</b> The switches acting as the bridge aggregators might support a lower number of VLAN IDs. If so, the Cisco CMTS router should be configured within the limits of the switches' maximum number of VLANs. |
| <i>cust-name</i>                 |  | (Optional) Identifies the customer using this VLAN. The <i>cust-name</i> can be any arbitrary alphanumeric string, up to 127 characters long.                                                                                                                                                                                                                                                              |
| <b>customer</b> <i>cust-name</i> |  | (Optional) Deletes all VCs belong to this customer. The <i>cust-name</i> can be any arbitrary alphanumeric string, up to 127 characters long.                                                                                                                                                                                                                                                              |

|                 |                               |
|-----------------|-------------------------------|
| <b>Defaults</b> | No default behavior or values |
|-----------------|-------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC2 | This command was introduced for Cisco uBR7246VXR universal broadband routers.                                      |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

This command maps a cable modem, on the basis of its hardware (MAC) address, to a particular IEEE 802.1Q VLAN on a particular outbound Ethernet interface. This enables the cable modem's traffic to be part of a virtual LAN at the Layer-2 level.

**Note**

To use this command, you must first enable the use of IEEE 802.1Q Layer 2 tunnels, using the **cable l2-vpn-service dot1q** command. Then use this command to map individual cable modems to specific VLANs.

**Examples**

The following example shows how to enable the use of Layer 2 tunnels and then map specific CMs to VLANs on a specific interface:

```
Router# config terminal
Router(config)# cable l2-vpn-service dot1q
Router(config)# cable dot1q-vc-map 000C.0e03.69f9 GigabitEthernet 1/0 4
Router(config)# cable dot1q-vc-map 0010.7bed.9c95 GigabitEthernet 1/0 5
Router(config)# exit
```

The following example shows the same command as above, but this time each VLAN is identified by the customer that is using it:

```
Router# config terminal
Router(config)# cable l2-vpn-service dot1q
Router(config)# cable dot1q-vc-map 000C.0e03.69f9 GigabitEthernet 1/0 4 ENTERPRISE-CO1
Router(config)# cable dot1q-vc-map 0010.7bed.9c95 GigabitEthernet 1/0 5 ENTERPRISE-CO2
Router(config)# exit
```

The following example shows how to remove the Layer 2 mapping for a specific cable modem. This particular cable modem's traffic is then routed using the normal Layer 3 routing processes.

```
Router# config terminal
Router(config)# no cable dot1q-vc-map 000C.0e03.69f9 GigabitEthernet 1/0 4
Router(config)# exit
```

**Related Commands**

| Command                               | Description                                                                                                                                                                |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable l2-vpn-service dot1q</b>     | Enables the use of Layer 2 tunnels so that traffic for individual cable modems can be routed over a particular Virtual Local Area Network (VLAN) on an Ethernet interface. |
| <b>debug cable l2-vpn</b>             | Displays debugging messages for the Layer 2 mapping of cable modems to particular PVCs or VLANs.                                                                           |
| <b>show cable l2-vpn dot1q-vc-map</b> | Displays the mapping of one or all cable modems to VLANs on the router's Ethernet interfaces.                                                                              |

# cable downstream annex

To set the Motion Picture Experts Group (MPEG) framing format for a downstream port on a cable interface line card to either Annex A (Europe) or Annex B (North America), use the **cable downstream annex** command in cable interface configuration mode.

**cable downstream annex {A | B}**

## Syntax Description

**A** Annex A. The downstream uses the EuroDOCSIS J.112 standard.

**B** Annex B. The DOCSIS-compliant cable plants that support North American channel plans use ITU J.83 Annex B downstream radio frequency.

## Command Default

Annex B for all Cisco cable interface cards other than the Cisco uBR-MC16E. Annex A, if using the Cisco uBR-MC16E cable interface line card and the Cisco uBR7111E and Cisco uBR7114E universal broadband routers.

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release                                                    | Modification                                                                                                              |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 12.1(1a)T1                                                 | This command was introduced.                                                                                              |
| 12.0(7)T, 12.1(1a)T1, 12.1 mainline, 12.0(8)SC, 12.1(2)EC1 | Support for Annex A was introduced for the Cisco uBR-MC16E cable interface line card.                                     |
| 12.1(7)EC                                                  | Support for Annex A was added for the Cisco uBR7111E and Cisco uBR7114E universal broadband routers.                      |
| 12.2(15)CX                                                 | Support was added for both Annex A and Annex B on the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line cards. |
| 12.2(15)BC2                                                | Support was added for both Annex A and Annex B on the Cisco uBR-MC5X20U/S cable interface line cards.                     |
| 12.3BC                                                     | This command was integrated into Cisco IOS Release 12.3BC.                                                                |
| 12.2(33)SCA                                                | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.        |

## Usage Guidelines

The MPEG framing format must be compatible with the downstream symbol rate you set. Annex B is the North America (DOCSIS) standard and Annex A is the European (EuroDOCSIS) standard. You should review your local standards and specifications for downstream MPEG framing to determine which format you should use.

The Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR-MC5X20U cable interface line cards support both Annex A and Annex B operation. However, on the Cisco uBR-MC28U/X, both downstreams must be configured for the same mode (either both Annex A or both Annex B).

On the Cisco uBR-MC16U and Cisco uBR-MC28U (with integrated upconverter), the IF frequency is fixed at 44 MHz for both Annex A and Annex B modes of operation. On the Cisco uBR-MC16X and Cisco uBR-MC28X (without integrated upconverter), the IF frequency is set to 36.125 MHz in Annex A mode and 44 MHz in Annex B mode.

**Note**

This command can be used to change the symbol rate, alpha, and other parameters for compliance with EuroDOCSIS (annex A), or DOCSIS (annex B). Annex A is not supported on the Cisco uBR-MC1xC, Cisco uBR-MC16B, Cisco uBR-MC16S, and Cisco uBR-MC28C cable interface line cards. Annex B is not supported on the Cisco uBR-MC16E card and on the Cisco uBR7111E and Cisco uBR7114E universal broadband routers.

**Note**

The cable interface line card downstream ports and the CMs on the HFC network connected through these ports must be set to the same MPEG framing format.

**Caution**

In Cisco IOS Release 12.1, only Annex B MPEG framing format is supported.

**Tip**

Changing the MPEG framing format affects the PHY layer on the downstream and disconnects all online CMs. For this reason, if you are using N+1 HCCP redundancy, you should configure this command on both the Protect and Working interfaces, so that the PHY layer is properly configured before a switchover occurs. Otherwise, online CMs could be disconnected when a switchover occurs. (This also applies to the **cable downstream modulation** and **cable downstream interleave-depth** commands.)

**Examples**

The following example shows how to set the MPEG framing format to Annex A:

```
Router# configure terminal
Router(config)# interface cable 1/0
Router(config-if)# cable downstream annex A
```

The following example shows how to set the MPEG framing format to Annex B:

```
Router# configure terminal
Router(config)# interface cable 4/0
Router(config-if)# cable downstream annex B
```

**Related Commands**

| Command                       | Description                                                               |
|-------------------------------|---------------------------------------------------------------------------|
| <b>show controllers cable</b> | Displays the downstream MPEG framing format (Annex A or Annex B) setting. |

# cable downstream attribute-mask

To configure an attribute for a cable interface or a wideband cable interface, use the **cable downstream attribute-mask** command in interface configuration mode. To disable this configuration, use the **no** form of this command.

**cable downstream attribute-mask** *mask*

**no cable downstream attribute-mask** *mask*

## Syntax Description

|             |                                             |
|-------------|---------------------------------------------|
| <i>mask</i> | Specifies the mask value for the interface. |
|-------------|---------------------------------------------|

## Command Default

If this command is not used, the default attribute will be used for the cable interface and the wideband cable interface. The default attribute for the wideband cable interface is 0x80000000 (31-bit) and for the cable interface is zero. For a wideband cable interface, 31-bit mask is always set to 1.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

The attribute-mask comprises 32 attributes and each attribute represents a single bit in the mask. You can configure a provisioned attribute mask for each channel and provisioned bonding group to assign values to the operator-defined binary attributes, or to override the default values of the specification-defined attributes. The operator may configure, in the CM configuration file, a required attribute mask and a forbidden attribute mask for a service flow. Additionally, in a CM-initiated dynamic service request, the CM can include a required attribute mask and a forbidden attribute mask for a service flow.

## Examples

The following example shows how to configure an attribute for a wideband cable interface:

```
Router# configure terminal
Router(config)# interface wideband-cable 1/0/0:0
Router(config-if)# cable downstream attribute-mask 800000ff
```

## Related Commands

| Command                         | Description                           |
|---------------------------------|---------------------------------------|
| <b>interface wideband-cable</b> | Specifies a wideband cable interface. |
| <b>interface cable</b>          | Specifies a cable interface.          |

# cable downstream channel-id

To configure the downstream channel ID, use the **cable downstream channel-id** command in cable interface configuration mode. To set the downstream channel ID to its default value, use the **no** form of this command.

**cable downstream channel-id** *id*

**no cable downstream channel-id**

## Syntax Description

*id* Specifies a downstream channel ID. Valid values for releases prior to Cisco IOS Release 12.2(33)SCB are from 0 to 255 and the valid values for Cisco IOS Release 12.2(33)SCB and later are from 1 to 255 as 0 is reserved for network management.

## Command Default

The unit number of the downstream device, starting with a value of 1.

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release      | Modification                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------|
| 12.0(5)T     | This command was introduced.                                                                                       |
| 12.3BC       | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCB1 | The downstream channel ID scheme was changed.                                                                      |

## Usage Guidelines

Use this command to make sure that each downstream channel has a unique ID when there are multiple Cisco CMTS routers at a headend facility.

Cisco IOS assigns the default ID number of each downstream channel in the order in which devices connected to the downstream channels appear to the CMTS router. The downstream channel connected to the first device that appears to the CMTS router is configured with a default ID of 1, the downstream channel connected to the second device that appears is configured with an ID of 2, and so on.

The local downstream channel channel ID is unique across all SPA channels. When you add a channel to the MAC domain using the **downstream modular-cable rf-channel** command, the channel IDs in the MAC domain are unique. This also facilitates channel ID uniqueness when the channels are added to a fiber node.

[Table 6](#) shows the 12.2(33)SCB1 downstream channel ID scheme and [Table 7](#) shows the 12.3(23)BCx scheme. This applies to **rf-channel rf-port cable downstream channel-id channel-id** command also.



**Table 6** Downstream Channel ID Scheme for 12.2(33)SCB1

|            | 8/1 | 8/0 | 7/1 | 7/0 | 6/1 | 6/0 | 5/1 | 5/0 | slot 3  | slot 1  |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|---------|---------|
| SPA Bay 0  |     |     |     |     |     |     |     |     | 217-240 | 193-216 |
| SPA Bay 1  |     |     |     |     |     |     |     |     | 217-240 | 193-216 |
| SPA Bay 2  |     |     |     |     |     |     |     |     | 217-240 | 193-216 |
| SPA Bay 3  |     |     |     |     |     |     |     |     | 217-240 | 193-216 |
| 5x20 DS /0 | 169 | 145 | 121 | 97  | 73  | 49  | 25  | 1   |         |         |
| 5x20 DS /1 | 173 | 149 | 125 | 101 | 77  | 53  | 29  | 5   |         |         |
| 5x20 DS /2 | 177 | 153 | 129 | 105 | 81  | 57  | 33  | 9   |         |         |
| 5x20 DS /3 | 181 | 157 | 133 | 109 | 85  | 61  | 37  | 13  |         |         |
| 5x20 DS /4 | 185 | 161 | 137 | 113 | 89  | 65  | 41  | 17  |         |         |

**Table 7** Downstream Channel ID Scheme for 12.3(23)BCx

|           | 8/1     | 8/0     | 7/1     | 7/0     | 6/1     | 6/0     | 5/1     | 5/0     | slot 3 | slot 1 |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|--------|--------|
| SPA Bay 0 |         |         |         |         |         |         |         |         | 24-47  | 24-47  |
| SPA Bay 1 |         |         |         |         |         |         |         |         | 48-71  | 48-71  |
| 5x20      | 188-192 | 180-184 | 168-172 | 160-164 | 148-152 | 140-144 | 128-132 | 120-124 |        |        |

**Caution**

Changing the downstream channel ID of an active channel automatically disconnects all connected CMs and forces them to go offline and reregister with the CMTS router, as required by the DOCSIS specifications.

**Examples**

The following example shows how to configure the downstream channel on the cable interface line card in slot 6 of a Cisco CMTS router with a channel ID of 44:

```
Router(config-if)# cable downstream channel-id 44
```

The following example shows how to restore the downstream channel ID configuration to the default configuration:

```
Router(config-if)# cable downstream channel-id
```

# cable downstream-channel-id automatic

To automatically configure the downstream channel IDs, use the **cable downstream-channel-id automatic** command in global configuration mode. To set the downstream channel ID (DCID) to its default value, use the **no** form of this command.

**cable downstream-channel-id automatic**

**no cable downstream-channel-id automatic**

| <b>Syntax Description</b>   | <b>automatic</b> Specifies an automatic assignment of the DCIDs by the Cisco CMTS.                                                                                                       |         |              |                             |                                                                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-----------------------------|------------------------------------------------------------------|
| <b>Command Default</b>      | No default behavior or values                                                                                                                                                            |         |              |                             |                                                                  |
| <b>Command Modes</b>        | Global configuration mode—(config)                                                                                                                                                       |         |              |                             |                                                                  |
| <b>Command History</b>      | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>12.2(33)SCE</td><td>This command was introduced.</td></tr> </table>                                                     | Release | Modification | 12.2(33)SCE                 | This command was introduced.                                     |
| Release                     | Modification                                                                                                                                                                             |         |              |                             |                                                                  |
| 12.2(33)SCE                 | This command was introduced.                                                                                                                                                             |         |              |                             |                                                                  |
| <b>Usage Guidelines</b>     | Use this command to automatically assign unique channel IDs for all downstream channels in a fiber node. Automatic DCIDs are not assigned to downstreams that are not in any fiber node. |         |              |                             |                                                                  |
| <b>Examples</b>             | <p>This example shows how to automatically configure the downstream channel IDs:</p> <pre>Router(config)# cable downstream-channel-id automatic</pre>                                    |         |              |                             |                                                                  |
| <b>Related Commands</b>     | <table> <tr> <th>Command</th><th>Description</th></tr> <tr> <td><b>show cable fibernode</b></td><td>Displays channel ID information for downstreams in a fiber node.</td></tr> </table>  | Command | Description  | <b>show cable fibernode</b> | Displays channel ID information for downstreams in a fiber node. |
| Command                     | Description                                                                                                                                                                              |         |              |                             |                                                                  |
| <b>show cable fibernode</b> | Displays channel ID information for downstreams in a fiber node.                                                                                                                         |         |              |                             |                                                                  |

# cable downstream dsg chan-list

To associate an Advanced-mode DOCSIS Set-Top Gateway (A-DSG) channel list entry to a downstream channel and include it in the Downstream Channel Descriptor (DCD) message on a Cisco CMTS router, use the **cable downstream dsg chan-list** command in interface configuration mode. To remove the configuration, use the **no** form of this command.

**cable downstream dsg chan-list** *list-index*

**no cable downstream dsg chan-list** *list-index*

|                           |                   |                                     |
|---------------------------|-------------------|-------------------------------------|
| <b>Syntax Description</b> | <i>list-index</i> | Alphanumeric list index identifier. |
|---------------------------|-------------------|-------------------------------------|

|                        |                                           |
|------------------------|-------------------------------------------|
| <b>Command Default</b> | Channel lists are not defined by default. |
|------------------------|-------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced to support A-DSG 1.1 on the Cisco uBR10012 and Cisco uBR7200 series routers.           |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

|                         |                                                                                           |
|-------------------------|-------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Global configuration for A-DSG must be complete before configuring interface definitions. |
|-------------------------|-------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                            |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows configuration of inclusion of DSG channel list entries in DCD messages on a downstream cable interface on a Cisco CMTS router: |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
interface Cable6/0
 cable downstream dsg chan-list 2
```

| Related Commands | Command                                | Description                                                                                                  |
|------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                  | <b>cable downstream dsg dcd-enable</b> | Enables DCD messages to be sent on a downstream channel on a Cisco CMTS router.                              |
|                  | <b>cable downstream dsg rule</b>       | Defines and associates an A-DSG rule to a downstream channel on a Cisco CMTS router.                         |
|                  | <b>cable downstream dsg timer</b>      | Associates an A-DSG timer entry to a downstream channel and includes the DCD message on a Cisco CMTS router. |

| Command                                  | Description                                                                                                     |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>cable downstream dsg vendor-param</b> | Associates A-DSG vendor parameters to a downstream and includes them in the DCD message on a Cisco CMTS router. |
| cable dsg chan-list                      | Configures the A-DSG downstream channel list on a CMTS router.                                                  |

# cable downstream dsg dcd-enable

To enable Downstream Channel Descriptor (DCD) messages to be sent on a downstream channel on a Cisco CMTS router, use the **cable downstream dsg dcd-enable** command in interface configuration mode. To disable DCD messages, use the **no** form of this command.

**cable downstream dsg dcd-enable**

**no cable downstream dsg dcd-enable**

**Syntax Description** This command has no arguments or keywords.

**Command Default** DCD messages are disabled.

**Command Modes** Interface configuration (config-if)

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced to support A-DSG 1.1 on the Cisc uBR10012 router and Cisco uBR7200 series routers.     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** Global configuration for Advanced-mode DOCSIS Set-top Gateway (A-DSG) must be complete before configuring interface definitions. This command is used when there are no enabled rules or tunnels for A-DSG on a Cisco CMTS router.

**Examples** The following example shows how to enable DCD messages on a downstream interface on a Cisco CMTS router along with several other A-DSG interface configuration commands:

```
interface Cable6/0
 cable downstream dsg dcd-enable
 cable downstream dsg chan-list 2
 cable downstream dsg timer 3
 cable downstream dsg vendor-param 2
 cable downstream dsg rule 1 priority 1 clients 1 tunnel 1
 cable downstream dsg rule 1 vendor-param 1
 cable downstream dsg rule 1 classifiers 1 5
 cable downstream dsg rule 2 priority 1 clients 2 tunnel 2
```

**Related Commands**

| Command                                  | Description                                                                                                                |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>cable downstream dsg chan-list</b>    | Associates the A-DSG channel list entry to a downstream channel, to be included in the DCD message on a Cisco CMTS router. |
| <b>cable downstream dsg rule</b>         | Defines and associates an A-DSG rule to a downstream channel on a Cisco CMTS router.                                       |
| <b>cable downstream dsg timer</b>        | Associates an A-DSG timer entry to a downstream channel and includes the DCD message on a Cisco CMTS router.               |
| <b>cable downstream dsg vendor-param</b> | Associates A-DSG vendor parameters to a downstream and includes them in the DCD message on a Cisco CMTS router.            |

# cable downstream dsg disable

To exclude the primary capable interface from DOCSIS Set-Top Gateway DSG forwarding, use the **cable downstream dsg disable** command in cable interface configuration mode. To remove the configuration, use the **no** form of this command.

**cable downstream dsg disable**

**no cable downstream dsg disable**

## Syntax Description

This command has no arguments or keywords.

## Command Default

None

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCG | This command was introduced. |

## Usage Guidelines

When DSG is enabled on the MAC domain interface and DSG forwarding is disabled on the primary capable interface, the Cisco CMTS router does not create multicast service flows on the primary capable interface.

If DSG forwarding is already enabled on the primary capable interface, the Cisco CMTS router removes multicast service flows from the interface.

## Examples

The following example shows how to disable A-DSG forwarding on a primary capable modular interface on the Cisco CMTS router:

```
Router# configure terminal
Router(config)# interface modular-cable 1/0/0:0
Router(config-if)# cable downstream dsg disable
Router(config-if)# end
```

## Associated Features

The **cable downstream dsg disable** command is associated with the [Advanced Mode DOCSIS Set-Top Gateway 1.2 for the Cisco CMTS Routers](#) feature.

## Related Commands

| Command                   | Description                                                     |
|---------------------------|-----------------------------------------------------------------|
| <b>cable dsg cfr</b>      | Defines and enables A-DSG classifiers on the Cisco CMTS router. |
| <b>show cable dsg cfr</b> | Displays DSG classifier details.                                |

# cable downstream dsg rule



## Note

Effective with Cisco IOS Release 12.3(17a)BC2, the **cable downstream dsg rule** command is removed from Cisco IOS software.

To define and associate an Advanced-mode DOCSIS Set-top Gateway (A-DSG) rule to the downstream channel on a Cisco CMTS router, use the **cable downstream dsg rule** command in interface configuration mode. To remove the DSG rule configuration, use the **no** form of this command.

```
cable downstream dsg rule rule-id [clients clnt-list-id tunnel tun-id | priority priority |
 vendor-param vsif-grp-id | ucid ucid1 | [ucid1 ucid2...ucidn] | cfr cfr-index [cfr-index...] |
 disable]
```

```
no cable downstream dsg rule rule-id [clients clnt-list-id tunnel tun-id | priority priority |
 vendor-param vsif-grp-id | ucid ucid1 | [ucid1 ucid2...ucidn] | cfr cfr-index [cfr-index...] |
 disable]
```

## Syntax Description

|                                                                           |                                                                                                     |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>rule-id</b>                                                            | Defines the DSG rule identifier.                                                                    |
| <b>clients</b> <i>clnt-list-id</i>                                        | Sets the DSG clients and associates the clients with the channel list identifier for this DSG rule. |
| <b>tunnel</b> <i>tun-id</i>                                               | Sets the DSG tunnel to be associated with this rule, and defines the DSG tunnel identifier.         |
| <b>priority</b> <i>priority</i>                                           | Sets the priority of the DSG rule.                                                                  |
| <b>vendor-param</b> <i>vsif-grp-id</i>                                    | Associates DSG vendor-specific parameters with the specified DSG rule.                              |
| <b>ucid</b> <i>ucid1</i>   [ <i>ucid1</i> <i>ucid2</i> ... <i>ucidn</i> ] | Sets the upstream channel identifier for the DSG rule.                                              |
| <b>cfr</b> <i>cfr-index</i> [ <i>cfr-index</i> ...]                       | Sets the index for the classifier value associated with the DSG rule.                               |
| <b>disable</b>                                                            | Disables a DSG rule.                                                                                |

## Command Default

DSG rules are disabled by default when they are created.

## Command Modes

Interface configuration (config-if)

## Command History

| Release      | Modification                                                                                                    |
|--------------|-----------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC  | This command was introduced to support A-DSG 1.1 on the Cisco uBR10012 router and Cisco uBR7200 series routers. |
| 12.3(17a)BC2 | This command was removed.                                                                                       |

## Usage Guidelines

Global configuration for A-DSG must be complete before configuring interface definitions.



Because rules are disabled when they are created, you must enable the configuration using the **no cable downstream dsg rule disable** form of the command. To disable a DSG rule configuration, use the **cable downstream dsg rule disable** form of this command.

You can associate DSG clients, vendor specific parameters, classifiers, DSG tunnel address, upstream channel identifier range, and rule priority to a downstream channel. You can apply more than one rule to a downstream channel. All configured rules that are enabled are included in the Downstream Channel Descriptor (DCD) message.

### Examples

The following example shows configuration and association of DSG rules on a downstream cable interface on a Cisco CMTS router, followed by an example of enabling the configured DSG rules:

```
interface Cable6/0
 cable downstream dsg rule 1 clients 1 tunnel 1
 cable downstream dsg rule 1 priority 1
 cable downstream dsg rule 1 vendor-param 1
 cable downstream dsg rule 1 classifiers 1 5
 cable downstream dsg rule 2 clients 2 tunnel 2
 cable downstream dsg rule 2 priority 1
!
! Enable the DSG rule configuration
!
no cable downstream dsg rule 1 disable
no cable downstream dsg rule 2 disable
```

The following example shows how to disable DSG rules that were previously enabled:

```
interface cable6/0
 cable downstream dsg rule 1 disable
 cable downstream dsg rule 2 disable
```

### Related Commands

| Command                                  | Description                                                                                                     |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>cable downstream dsg chan-list</b>    | Associates an A-DSG channel list to a downstream channel on a Cisco CMTS router.                                |
| <b>cable downstream dsg dcd-enable</b>   | Enables DCD messages to be sent on a downstream channel on a Cisco CMTS router.                                 |
| <b>cable downstream dsg timer</b>        | Associates an A-DSG timer entry to a downstream channel and includes the DCD message on a Cisco CMTS router.    |
| <b>cable downstream dsg vendor-param</b> | Associates A-DSG vendor parameters to a downstream and includes them in the DCD message on a Cisco CMTS router. |

# cable downstream dsg tg

To associate an Advanced-Mode DOCSIS Set-Top Gateway (A-DSG) tunnel group to a MAC domain interface on a Cisco CMTS router, use the **cable downstream dsg tg** command in cable interface configuration mode. To remove this association, use the **no** form of this command.

**cable downstream dsg tg** *tgid* [**channel** *channel\_ID* | **priority** *DSG-rule-priority* [**enable** | **disable**] | **ucid** *ID1* [*ID2 ID3 ID4*] | **vendor-param** *vendor-group-ID*]

**no cable downstream dsg tg** *tgid*

|                           |                                            |                                                                                                              |
|---------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>dsg tg</b> <i>tgid</i>                  | Specifies the tunnel group ID. The valid range is from 1 to 65535.                                           |
|                           | <b>channel</b> <i>channel_ID</i>           | (Optional) Specifies the downstream channel ID. The valid range is from 1 to 65535.                          |
|                           | <b>priority</b> <i>DSG-rule-priority</i>   | (Optional) Specifies the DSG rule priority for the cable interface. The valid range is from 0 to 255.        |
|                           | <b>enable</b>                              | (Optional) Enables the DSG rule priority on a DSG tunnel group.                                              |
|                           | <b>disable</b>                             | (Optional) Disables the DSG rule priority on a DSG tunnel group.                                             |
|                           | <b>ucid</b> <i>upstream-channel-ID</i>     | (Optional) Specifies the upstream channel ID (UCID). You can specify a maximum of four upstream channel IDs. |
|                           | <b>vendor-param</b> <i>vendor-group-ID</i> | (Optional) Specifies the vendor specific parameters group ID. The valid range is from 1 to 65535.            |

**Command Default** The DSG traffic is not forwarded to the MAC domain.

**Command Modes** Interface configuration (config-if)

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCG    | This command was introduced. |

**Usage Guidelines** If you do not specify a downstream channel ID using the **channel** keyword, the Cisco CMTS router automatically assigns a free channel to associate the MAC domain interface with the DSG tunnel group. This channel is created with default parameters.

If you specify the **channel** keyword in the **no** form of the command, only the MAC domain to DSG tunnel group association is removed from the configuration. If the **no** form of the command is used without the **channel** keyword, both the tunnel group association and the channel are removed.

Examples

The following example shows how to associate an A-DSG tunnel group to a MAC domain interface on a Cisco CMTS router:

```
Router(config)# interface cable 5/1/0
Router(config-if)# cable downstream dsd tg 1
Router(config-if)# cable downstream dsd tg 1 channel 22
Router(config-if)# cable downstream dsd tg 1 priority 2 enable
Router(config-if)# cable downstream dsd tg 1 ucid 1 2 3 4
Router(config-if)# cable downstream dsd tg 1 vendor-param 20
```

Associated Features

The **cable downstream dsd tg** command is used to configure the [Advanced Mode DOCSIS Set-Top Gateway 1.2 for the Cisco CMTS Routers](#) feature.

Related Commands

| Command                             | Description                                                   |
|-------------------------------------|---------------------------------------------------------------|
| <b>cable downstream dsd disable</b> | Excludes the primary capable interface from A-DSG forwarding. |

# cable downstream dsg tg channel

To associate an Advanced-mode DOCSIS Set-Top Gateway (A-DSG) tunnel group to a downstream interface on a Cisco CMTS router, use the **cable downstream dsg tg channel** command in interface configuration mode. To remove this configuration, use the **no** form of this command.

**cable downstream dsg tg** *group-id* **channel** *channel-id*

**no cable downstream dsg tg** *group-id* **channel** *channel-id*

## Syntax Description

|                   |                                                                          |
|-------------------|--------------------------------------------------------------------------|
| <i>group-id</i>   | Specifies the A-DSG tunnel group identifier as a number from 1 to 65535. |
| <i>channel-id</i> | Specifies the downstream channel identifier as a number from 1 to 65535. |

## Command Default

The A-DSG tunnel group is not associated to a downstream interface.

## Command Modes

Interface configuration (config-if)

## Command History

| Release      | Modification                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC2 | This command was introduced to support A-DSG 1.2 on the Cisco uBR10012 router and Cisco uBR7200 series routers.    |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The **cable dsg tg channel** global configuration command establishes the configuration of tunnels in a tunnel group. Tunnel groups are enabled by default.

Then, you can associate the tunnel group to a downstream cable interface using the **cable downstream dsg tg channel** interface configuration command.

## Examples

The following example shows the configuration and activation of a tunnel group with ID of 1 and channel ID of 2 in global configuration, followed by association of the tunnel group to a downstream interface on a Cisco CMTS router:

```
cable dsg tg 1 channel 2
interface cable 8/1/2
 cable downstream dsg tg 1 channel 2
```

## Related Commands

| Command                                  | Description                                                                                                               |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>cable downstream dsg chan-list</b>    | Associates an A-DSG channel list entry to a downstream channel and includes it in the DCD message on a Cisco CMTS router. |
| <b>cable downstream dsg dcd-enable</b>   | Enables DCD messages to be sent on a downstream channel on a Cisco CMTS router.                                           |
| <b>cable downstream dsg timer</b>        | Associates an A-DSG timer entry to a downstream channel and includes the DCD message on a Cisco CMTS router.              |
| <b>cable downstream dsg vendor-param</b> | Associates A-DSG vendor parameters to a downstream and includes them in the DCD message on a Cisco CMTS router.           |
| <b>cable dsg tunnel</b>                  | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router.                          |

# cable downstream dsg timer

To associate an Advanced-mode DOCSIS Set-Top Gateway (A-DSG) timer entry to a downstream channel and include it in the Downstream Channel Descriptor (DCD) message on a Cisco CMTS router, use the **cable downstream dsg timer** command in interface configuration mode. To remove this setting, use the **no** form of this command.

**cable downstream dsg timer** *timer-index*

**no cable downstream dsg timer** *timer-index*

|                           |                    |                                                    |
|---------------------------|--------------------|----------------------------------------------------|
| <b>Syntax Description</b> | <b>timer-index</b> | Identifier for the DSG timer setting in the index. |
|---------------------------|--------------------|----------------------------------------------------|

|                        |                                                        |
|------------------------|--------------------------------------------------------|
| <b>Command Default</b> | The downstream DSG timer is not configured by default. |
|------------------------|--------------------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced to support A-DSG 1.1 on the Cisco uBR10012 router and Cisco uBR7200 series routers.    |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

|                         |                                                                                           |
|-------------------------|-------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Global configuration for A-DSG must be complete before configuring interface definitions. |
|-------------------------|-------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows the configuration DSG timers for inclusion in DCD messages on a downstream cable interface on a Cisco CMTS router: |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------|

```
interface Cable6/0
 cable downstream dsg timer 3
```

| Related Commands | Command                                  | Description                                                                                                              |
|------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable downstream dsg chan-list</b>    | Associates an A-DSG channel list entry to a downstream channel and include it in the DCD message on a Cisco CMTS router. |
|                  | <b>cable downstream dsg dcd-enable</b>   | Enables DCD messages to be sent on a downstream channel on a Cisco CMTS router.                                          |
|                  | <b>cable downstream dsg rule</b>         | Defines and associates an A-DSG rule to a downstream channel on a Cisco CMTS router.                                     |
|                  | <b>cable downstream dsg vendor-param</b> | Associates A-DSG vendor parameters to a downstream and includes them in the DCD message on a Cisco CMTS router.          |

# cable downstream dsg vendor-param

To associate Advanced-mode DOCSIS Set-Top Gateway (A-DSG) vendor parameters to a downstream, to be included in the Downstream Channel Descriptor (DCD) message on a Cisco CMTS router, use the **cable downstream dsg vendor-param** command in interface configuration mode. To remove this configuration from a Cisco CMTS router, use the **no** form of this command.

**cable downstream dsg vendor-param** *vsif-grp-id*

**no cable downstream dsg vendor-param** *vsif-grp-id*

|                           |                    |                                                        |
|---------------------------|--------------------|--------------------------------------------------------|
| <b>Syntax Description</b> | <i>vsif-grp-id</i> | Associates a vendor parameter with a group identifier. |
|---------------------------|--------------------|--------------------------------------------------------|

|                        |                                            |
|------------------------|--------------------------------------------|
| <b>Command Default</b> | This command is not configured by default. |
|------------------------|--------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced to support A-DSG 1.1 on the Cisco uBR10012 router and Cisco uBR7200 series routers.    |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

|                         |                                                                                           |
|-------------------------|-------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Global configuration for A-DSG must be complete before configuring interface definitions. |
|-------------------------|-------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                                                |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows configuration of A-DSG vendor parameters on a downstream interface, along with several other downstream interface commands on a Cisco CMTS router: |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
interface Cable6/0
 cable downstream dsg dcd-enable
 cable downstream dsg chan-list 2
 cable downstream dsg timer 3
 cable downstream dsg vendor-param 2
 cable downstream dsg rule 1 priority 1 clients 1 tunnel 1
 cable downstream dsg rule 1 vendor-param 1
 cable downstream dsg rule 1 classifiers 1 5
 cable downstream dsg rule 2 priority 1 clients 2 tunnel 2
```

| Related Commands | Command                                | Description                                                                                                              |
|------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable downstream dsg chan-list</b>  | Associates an A-DSG channel list entry to a downstream channel and include it in the DCD message on a Cisco CMTS router. |
|                  | <b>cable downstream dsg dcd-enable</b> | Enables DCD messages to be sent on a downstream channel on a Cisco CMTS router.                                          |

| Command                           | Description                                                                                                  |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>cable downstream dsg rule</b>  | Defines and associates an A-DSG rule to a downstream channel on a Cisco CMTS router.                         |
| <b>cable downstream dsg timer</b> | Associates an A-DSG timer entry to a downstream channel and includes the DCD message on a Cisco CMTS router. |



# cable downstream frequency

To note the downstream center frequency for the cable interface line card to reflect the digital carrier frequency of the downstream radio frequency carrier (the channel) for that downstream port, use the **cable downstream frequency** command in cable interface configuration mode. On cable interfaces with an integrated upconverter, to unset the downstream frequency and to disable the RF output from the integrated upconverter, use the **no** form of this command.

**cable downstream frequency** *down-freq-hz*

**no cable downstream frequency**

## Syntax Description

*down-freq-hz* The known center frequency of the downstream carrier in Hz (the valid range is 55,000,000 to 858,000,000). The usable range depends on whether the downstream is configured for DOCSIS or EuroDOCSIS operations:

- DOCSIS = 88,000,000 to 855,000,000 MHz
- Extended frequency range = 70,000,000 to 855,000,000 MHz
- EuroDOCIS = 112,000,000 to 858,000,000 MHz

The Cisco IOS supports a superset of these standards, and setting a center frequency to a value outside these limits violates the DOCSIS or EuroDOCSIS standards. Cisco does not guarantee the conformance of the downstream and upconverter outputs when using frequencies outside the DOCSIS or EuroDOCSIS standards.

## Command Default

Disabled. On the Cisco uBR7100 series routers, the default downstream center frequency for the integrated upconverter is 500 MHz.

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release                    | Modification                                                                                                                                                                                                                                                   |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 XA                    | This command was introduced to support NTSC/DOCSIS Annex B RF operation.                                                                                                                                                                                       |
| 12.0(7)XR2, 12.0(8)SC      | Modified to support PAL/SECAM EuroDOCSIS RF operation.                                                                                                                                                                                                         |
| 12.1(2)EC1                 | Supports both Annex A and Annex B.                                                                                                                                                                                                                             |
| 12.1(5)EC1                 | Modified to support the integrated upconverter on the Cisco uBR7100 series universal broadband router.                                                                                                                                                         |
| 12.2(11)CY,<br>12.2(11)BC3 | Support was added for the Cisco uBR-MC5X20S cable interface line card.                                                                                                                                                                                         |
| 12.2(15)CX                 | Support was added for the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line cards.                                                                                                                                                                  |
| 12.2(15)BC2                | Support was added for the extended frequency range and for the Cisco uBR-MC5X20U cable interface line card. In addition, the command was changed to accept only center frequencies in 250 KHz increments (previously, the command allowed 125 KHz increments). |

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

This command is either optional or required, depending on the cable interface line card being used.

- On the Cisco uBR7100 series routers using the integrated upconverter (the DS0 RF output), and on cable interfaces that support integrated upconverters (such as the Cisco uBR-MC16U, Cisco uBR-MC28U, and Cisco uBR-MC5X20U), this command configures the frequency for the integrated upconverter. The **no** form of this command unsets the frequency and disables the output from the integrated upconverter.
- For cable interfaces that use an external upconverter (such as the Cisco uBR-MC16S and the DS0 (IF) output on Cisco uBR7100 series routers), this command is informational-only, because it does not affect the external upconverter. The external upconverter must be programmed separately with the appropriate center frequency.

**Note**

The **no** form of this command is supported only on the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR-MC5X20S/U cable interface line cards, and on the Cisco uBR7100 series universal broadband router.

**Note**

We recommend configuring this command on all cable interfaces, even those that are using external upconverters. This is because this command is required to enable the downstream frequency override feature and for N+1 line card redundant operation when using SNMP-capable external upconverters.

The downstream frequency of your RF output must be set to match the expected input frequency of your upconverter. To do this, you enter the fixed center frequency of the downstream channel for the downstream port. (You can also select a default that does not set a specific fixed value.) The valid range for a fixed center frequency is 54,000,000 to 858,000,000 Hz. The center frequency is also used to configure an IF-to-RF upconverter that must be installed in your downstream path.

The digital carrier frequency is specified to be the center of a 6.0 MHz channel. For example, EIA channel 95 spans 90.000 to 96.000 MHz. The center frequency is 93.000 MHz, which is the digital carrier frequency that should be configured as the downstream frequency. The typical range for current CATV headends is 88,000,000 to 860,000,000 Hz.

In Cisco IOS software releases before Cisco IOS Release 12.2(15)BC2, the **cable downstream frequency** command allowed the center frequency to be specified in 125 KHz increments. In Cisco IOS Release 12.2(15)BC2 and later releases, this was changed to allow only 250 KHz increments, because of the requirements of the Broadband Processing Engine cable interface line cards that use an internal upconverter (Cisco uBR-MC16U, Cisco uBR-MC28U, and Cisco uBR-MC5X20S/U).

**Note**

DOCSIS allows downstreams to use any center frequency within 88,000,000 to 855,000,000 MHz. However, when most cable modems first come online, they initially start scanning the downstream for the frequencies that are in the NTSC channel plan. If a valid downstream is not found among those frequencies, the cable modems then begin scanning the remaining frequencies. For the fastest and most efficient registration times, we recommend configuring downstreams for the frequencies that are specified in the NTSC channel plan.

**Examples**

The following example shows how to set the downstream center frequency display value:

```
Router(config)# interface c6/0
Router(config-if)# cable downstream frequency 96000000
```

**Related Commands**

| Command                             | Description                                                                                                                                                       |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable downstream annex</b>       | Sets the MPEG framing format for a downstream port on a cable interface line card to either Annex A (Europe) or Annex B (North America).                          |
| <b>cable downstream rf-power</b>    | Configures the desired RF output power on the integrated upconverter.                                                                                             |
| <b>cable downstream rf-shutdown</b> | Enables or disables the RF output from the integrated upconverter.                                                                                                |
| <b>show controllers cable</b>       | Displays status and configuration information for the cable interface. On supported cable interfaces, this includes information about the integrated upconverter. |

# cable downstream if-output

To activate a downstream port on a cable interface and to generate either a standard modulated signal or a test signal, use the **cable downstream if-output** command in cable interface configuration mode. To disable all signal output on the intermediate frequency (IF) carrier and to shut down the interface, use the **no** form of this command.

**cable downstream if-output** [**continuous-wave** | **prbs**]

**no cable downstream if-output**

## Syntax Description

|                        |                                                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>continuous-wave</b> | Outputs an unmodulated carrier signal on the downstream, shutting down normal data network operations.                 |
| <b>prbs</b>            | Outputs a Pseudo Random Bit Stream (PRBS) test signal on the downstream, shutting down normal data network operations. |

## Command Default

The downstream interface is enabled for normal data use (**cable downstream if-output**).

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release                                          | Modification                                                                                                                              |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 XA                                          | This command was introduced.                                                                                                              |
| 12.0(7)XR2,<br>12.0(7)T,<br>12.0(0)SC,12.1(2)EC1 | This command was modified to support Annex A (EuroDOCSIS) downstreams, and the <b>continuous-wave</b> and <b>prbs</b> options were added. |
| 12.3BC                                           | This command was integrated into Cisco IOS Release 12.3BC.                                                                                |
| 12.2(33)SCA                                      | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                        |

## Usage Guidelines

Typically, a downstream is configured to output a modulated signal, using the **cable downstream if-output** command, allowing data transmissions to be sent over the HFC cable network. However, this command can also be used to test the cable plant or to shut down the interface completely:

- **cable downstream if-output continuous-wave**—Generates an unmodulated, continuous sine wave on the downstream interface. You can use a spectrum analyzer to verify the frequency, amplitude, and power of the wave. The test signal continues on the downstream until you resume normal modulated operations using the **cable downstream if-output** command.
- **cable downstream if-output prbs**—Generates a PRBS test signal on the downstream interface. You can use a spectrum analyzer to verify the frequency, amplitude, and power of the wave. The test signal continues on the downstream until you resume normal modulated operations using the **cable downstream if-output** command.

- **no cable downstream if-output**—Terminates all signal output and shuts down the downstream interface. The interface remains shut down until you reactive the downstream using the **cable downstream if-output** command.

**Note**

Generating a PRBS or continuous-wave test signal or shutting down the interface automatically stops the modulated carrier data signal and disconnects all CMs on that downstream. These commands should not be used on a live network except as part of troubleshooting major network problems.

**Examples**

The following example shows how to enable downstream port 0 on a cable interface:

```
Router# configure terminal
Router# interface c6/0
Router(config-if)# cable downstream if-output
```

The following example shows a PRBS test signal being generated on a downstream for a period of time. The downstream is then shut down so that the test engineer can verify that no signal is being sent on the downstream. After the tests have been run, the downstream is reactivated for normal modulated data use:

```
Router# configure terminal
Router# interface c6/0
Router(config-if)# cable downstream if-output prbs
(the signals are verified by a spectrum analyzer...)
Router(config-if)# no cable downstream if-output
(the downstream is checked to verify no signals are being sent on it...)
Router(config-if)# cable downstream if-output
Router(config-if)# exit
```

# cable downstream interleave-depth

To set the downstream interleave depth, use the **cable downstream interleave-depth** command in cable interface configuration mode. To restore the default setting, use the **no** form of this command.

**cable downstream interleave-depth { 8 | 16 | 32 | 64 | 128 }**

**no cable downstream interleave-depth**

|                           |                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>8   16   32   64   128</b> Indicates the downstream interleave depth in number of rows of codewords. |
|---------------------------|---------------------------------------------------------------------------------------------------------|

|                        |    |
|------------------------|----|
| <b>Command Default</b> | 32 |
|------------------------|----|

|                      |                                                          |
|----------------------|----------------------------------------------------------|
| <b>Command Modes</b> | Interface configuration—cable interface only (config-if) |
|----------------------|----------------------------------------------------------|

| Command History | Release                             | Modification                                                                                                       |
|-----------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 XA                             | This command was introduced.                                                                                       |
|                 | 12.0(7)XR2,<br>12.0(0)SC,12.1(2)EC1 | This command was modified to support Annex A operation (which uses a fixed interleave).                            |
|                 | 12.3BC                              | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                 | 12.2(33)SCA                         | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
|                 |                                     |                                                                                                                    |

## Usage Guidelines



### Note

This command is not supported on the Cisco uBR-MC16E cable interface line card or on the Cisco uBR7111E and Cisco uBR7114E universal broadband routers, because the interleave on the EuroDOCSIS downstream is fixed.

This command sets the minimum latency of the system. A higher interleave depth provides more protection from bursts of noise on the HFC network by spreading out the bits for each codeword over a greater transmission time.

Interleave transmissions do not transmit each codeword by itself, but instead send bits from multiple codewords at the same time, so that a noise burst affects the minimum number of bits per codeword, which allows the Forward Error Correction (FEC) algorithm a greater chance of detecting and correcting any transmission errors.

A higher interleave depth transmits bits from a greater number of codewords, increasing the efficacy of the FEC algorithm. However, a higher depth also increases downstream latency, which might slow TCP/IP throughput for some configurations, so you need to choose an interleave depth that is appropriate both for your plant's noise levels and application needs.

If your cable plant is experiencing high noise levels, consider increasing the interleave from the default of 32 to 64. For plants with exceptionally high noise levels, increase the interleave to 128 to provide the maximum protection from noise bursts.

Low interleave depth values typically cause some packet loss on typical HFC networks, because burst noise lasts beyond the error correction block correctable length. However, on cable plants with exceptionally low noise levels, Cisco recommends initially using the default value of 32, and then trying an interleave of either 16 or 8 to see if this increases performance without increasing the number of errors that result from noise.

Table 8 shows interleave characteristics and their relation to each other.

**Table 8** *DOCSIS Downstream Cable Interleave Descriptions*

| I (Number of Taps) | J (Increment) | Burst Protection<br>64-QAM/256 QAM | Latency<br>64-QAM/256 QAM |
|--------------------|---------------|------------------------------------|---------------------------|
| 8                  | 16            | 5.9 microseconds/4.1 milliseconds  | 0.22 ms/0.15 ms           |
| 16                 | 8             | 12 microseconds/8.2 milliseconds   | 0.48 ms/0.33 ms           |
| 32                 | 4             | 24 microseconds/16 milliseconds    | 0.98 ms/0.68 ms           |
| 64                 | 2             | 47 microseconds/33 milliseconds    | 2.0 ms/1.4 ms             |
| 128                | 1             | 95 microseconds/66 milliseconds    | 4.0 ms/2.8 ms             |



**Note**

Table 8 does not apply to EuroDOCSIS cable plants because the interleave depth for EuroDOCSIS cable interfaces is fixed.



**Tip**

Changing the interleave depth affects the PHY layer on the downstream and disconnects all online CMs. For this reason, if you are using N+1 HCCP redundancy, you should configure this command on both the Protect and Working interfaces, so that the PHY layer is properly configured before a switchover occurs. Otherwise, online CMs could be disconnected when a switchover occurs. (This also applies to the **cable downstream annex** and **cable downstream modulation** commands.)

## Examples

The following example shows how to configure the downstream interleave depth to 128 microseconds:

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable downstream interleave-depth 128
```

# cable downstream modulation

To set the modulation format for a downstream port on a cable interface line card, use the **cable downstream modulation** command in cable interface configuration mode.

**cable downstream modulation { 64qam | 256qam }**

## Syntax Description

|               |                                                  |
|---------------|--------------------------------------------------|
| <b>64qam</b>  | Modulation rate is 6 bits per downstream symbol. |
| <b>256qam</b> | Modulation rate is 8 bits per downstream symbol. |

## Command Default

64qam

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 11.3 XA     | This command was introduced.                                                                                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

Downstream modulation defines the speed in bits per second at which data travels downstream to the subscriber's CM. A symbol is the basic unit of modulation. QPSK encodes 2 bits per symbol, 16-QAM encodes 4 bits per symbol, 64-QAM encodes 6 bits per symbol, and 256-QAM encodes 8 bits per symbol.



### Note

Setting a downstream modulation format of 256-QAM requires approximately a 6-dB higher signal-to-noise ratio (SNR) than 64-QAM at the subscriber's cable modem. If your network is marginal or unreliable at 256-QAM, use the 64-QAM format instead.



### Tip

Changing the modulation format affects the PHY layer on the downstream and disconnects all online CMs. For this reason, if you are using N+1 HCCP redundancy, you should configure this command on both the Protect and Working interfaces, so that the PHY layer is properly configured before a switchover occurs. Otherwise, online CMs could be disconnected when a switchover occurs. (This also applies to the **cable downstream annex** and **cable downstream interleave-depth** commands.)

## Examples

The following example shows how to set the downstream modulation to 256-QAM:

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable downstream modulation 256qam
```



# cable downstream override

To enable cable downstream frequency override, use the **cable downstream override** command in cable interface configuration mode. To disable the override feature, use the **no** form of this command.

**cable downstream override**

**no cable downstream override**

## Syntax Description

This command has no keywords or arguments.

## Command Default

Cable downstream frequency override is enabled by default.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release              | Modification                                                                                                       |
|----------------------|--------------------------------------------------------------------------------------------------------------------|
| 12.0(13)SC           | This command was introduced.                                                                                       |
| 12.1(5)EC1           | This command was integrated into Cisco IOS Release 12.1(5)EC1.                                                     |
| 12.1(6) and 12.1(6)T | This command was integrated into Cisco IOS Release 12.1(6) and Cisco IOS Release 12.1(6)T.                         |
| 12.3BC               | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA          | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

This command is never needed for normal operations, because downstream frequency override is enabled by default for DOCSIS operations. However, this command can be used to disable the frequency override feature for test and lab use, so as to force the CMs on that interface to use a particular downstream frequency, regardless of the signal quality.



### Note

Because frequency override is enabled by default, this command does not appear as part of a cable interface's configuration section in the Cisco CMTS router configuration file unless the **no cable downstream override** command has been given.

## Examples

The following example shows how to disable the downstream frequency override feature on a particular cable interface:

```
Router# configure terminal
Router(config)# interface cable 6/0
Router(config-if)# no cable downstream override
Router(config-if)# exit
```

# cable downstream qos wfq weight

To specify custom DOCSIS priority to excess ratio mappings for downstream service flows, use the **cable downstream qos wfq weight** command in cable interface configuration mode. Use the **no** form of this command to revert to the default mappings.

**cable downstream qos wfq weights** *weight1...weight8*

**no cable downstream qos wfq weights**

## Syntax Description

|                              |                                                                                                                             |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>weights</b> <i>weight</i> | Specifies the custom excess ratios for 8 priorities.                                                                        |
|                              | <ul style="list-style-type: none"> <li><i>weight1...weight8</i>—Custom weight. Valid values range from 1 to 100.</li> </ul> |

## Command Default

DOCSIS priority to excess ratio mapping is used.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

This command configures custom DOCSIS priority to excess ratio mappings for downstream service flows.

## Examples

The following example shows how to configure custom DOCSIS priority to excess ratio mappings for downstream service flows:

```
Router# configure terminal
Router(config)# interface cable 8/0/0
Router(config-if)# cable downstream qos wfq weights 10 20 30 40 50 60 70 80
```

## Related Commands

| Command                                    | Description                                                                                                |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>show cr10k-rp queue</b>                 | Displays the queue parameters associated with downstream service flow queues (including the excess ratio). |
| <b>show running-config interface cable</b> | Displays the configuration for the specified cable interface.                                              |

# cable downstream rate-limit



## Note

Effective with Cisco IOS Release 12.2(33)SCF, the **cable downstream rate-limit** command is not supported for Cisco uBR-MC88U line card in Cisco IOS software.

To enable DOCSIS rate limiting on downstream traffic, use the **cable downstream rate-limit** command in cable interface configuration mode. To disable DOCSIS rate limiting on downstream traffic, use the **no** form of this command.

**cable downstream rate-limit** [**token-bucket** [[**shaping** [**granularity** *msec* | **max-delay** *msec*]] | **weighted-discard**] [*exp-weight*]

**no cable downstream rate-limit**

## Syntax Description

|                                |                                                                                                                                                                                                                                                                     |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>token-bucket</b>            | (Optional) Specifies the token-bucket filter algorithm, which enforces an average long-term transmission rate while permitting occasional bursts.                                                                                                                   |
| <b>shaping</b>                 | (Optional in Release 12.1 EC, Required in Release 12.2 BC) Enables rate limiting on the downstream port using the token-bucket policing algorithm with default traffic shaping parameters.                                                                          |
| <b>granularity</b> <i>msec</i> | (Optional) Specifies traffic shaping granularity in milliseconds. Valid values are 1, 2, 4, 8, or 16 milliseconds.                                                                                                                                                  |
| <b>max-delay</b> <i>msec</i>   | (Optional) Specifies the maximum traffic-shaping buffering delay in milliseconds. Valid values are 128, 256, 512, or 1028 milliseconds. As a general guideline, the lower the downstream rates, the higher the delay should be to ensure full use of the bandwidth. |
| <b>weighted-discard</b>        | (Optional) Specifies the weighted discard algorithm.                                                                                                                                                                                                                |
| <i>exp-weight</i>              | (Optional) Specifies the weight for the exponential moving average of loss rate. Valid values are from 1 to 4.                                                                                                                                                      |

## Command Default

In Cisco IOS Release 12.1 EC and earlier releases, the system defaults to monitoring the traffic to and from each CM over each 1-second period, and if the CM exceeds its bandwidth quota for that second, the CMTS router drops packets for the rest of the second (**no cable downstream rate-limit**).

In Cisco IOS Release 12.2 BC and later releases, the **token-bucket** and **shaping** keywords are on by default, and the **max-delay** option is set to 128 milliseconds (**cable downstream rate-limit token-bucket shaping max-delay 128**).



## Note

In Cisco IOS Release 12.2 BC, do not use the **cable downstream rate-limit token** command without specifying the **shaping** option, because this results in packet drops.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release                                | Modification                                                                                                                                                       |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3(6) NA                             | This command was introduced.                                                                                                                                       |
| 12.0(4)XI,<br>12.0(5)T1,<br>12.1(1)EC1 | The <b>shaping</b> keyword was added.                                                                                                                              |
| 12.2(4)BC1                             | Support was added to the 12.2 BC train, and the defaults were changed so that the <b>shaping</b> keyword is on by default, to accommodate DOCSIS 1.1 requirements. |
| 12.3BC                                 | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                         |
| 12.2(33)SCA                            | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                 |
| 12.2(33)SCF                            | This command does not support Cisco uBR-MC88U line card in Cisco IOS software.                                                                                     |

## Usage Guidelines

The **cable downstream rate-limit** command specifies the type of DOCSIS rate limiting that the CMTS router imposes on downstream traffic that is sent to the CMs. When rate-limiting is enabled, traffic to the CM is examined to ensure it will not exceed the limit set for the CM.

For DOCSIS networks, the best rate limiting algorithm combines the **token-bucket** and **shaping** to use keywords, which is optimized for relatively steady data rates, such as are used for web browser, without allowing the user to exceed the maximum allowable download rate that is specified in the DOCSIS configuration file.



## Note

The **token-bucket** and **shaping** options are the default in Cisco IOS Release 12.2 BC and should not be changed. If using a 64 kbps downstream rate, you can avoid a performance impact by turning off the **shaping** option, but this is not recommended for DOCSIS 1.1 operation because it can result in erratic traffic patterns and packet drops on the downstream.

If a packet would exceed the traffic limits for a CM, the CMTS router will buffer the packet, up to the maximum delay time given by the **max-delay** option, so that the traffic can be sent at a later time when it would not violate the maximum downstream traffic limits. If the packet is still too large, or if the volume of traffic consistently exceeds the traffic limits, even after the delay, the CMTS router begins dropping packets.

The default behavior of the **cable downstream rate-limit** command was changed in Cisco IOS Release 12.2 BC to accommodate the different requirements of DOCSIS 1.1 operation (which requires the use of the token-bucket rate-limiting algorithm). This default is optimized for downstream traffic rates that are higher than 84 kbps.

If you are using a 64 kbps downstream traffic rate on a Cisco CMTS router that is running Cisco IOS Release 12.2 BC, you should set the **max-delay** option to 256 milliseconds to avoid a performance impact on TCP/IP traffic that uses packets larger than 1024 bytes (such as FTP or HTTP web traffic). Alternatively, you can set the **max-burst** option on the **cable service class** command to 3044, which is two packets of the minimum size for DOCSIS 1.1 networks.

## Understanding the max-delay and granularity Options

The Cisco CMTS router uses a calendar-queuing system to process the packets being shaped. The calendar queue is a time wheel that is as big as the value specified by the **max-delay** option (128, 256, 512, or 1028 milliseconds), and is divided into “buckets” of the size specified by the **granularity** option (1, 2, 4, 8, or 16 milliseconds).

The number of buckets depends on both the **max-delay** and **granularity** options. For example, if the **max-delay** option is set to 256 milliseconds, and the **granularity** option is set to 4 milliseconds, the calendar queue contains  $256/4$ , or 64, buckets, where a new bucket is processed every 4 milliseconds.

When the Cisco CMTS router adds a shaped packet to the queue, it adds the packet into the bucket that corresponds to the deadline by which the packet must be processed. At the end of every granularity time period, the Cisco CMTS router processes the packets that are in the corresponding bucket.

Decreasing the **max-delay** value increases how often the packets in the entire queue are processed, while decreasing the **granularity** value increases the accuracy of the shaping mechanism. Decreasing these values, however, could result in a possible increase in CPU processor usage. In most circumstances, this increase in processor usage is negligible, but it should be monitored whenever fine-tuning the **max-delay** or **granularity** values.

**Tip**

For more information about the DOCSIS 1.1 rate-limiting specifications, see section C.2.2.5.2, *Maximum Sustained Traffic Rate*, in the DOCSIS 1.1 specification.

**Examples**

The following example shows how to apply the token-bucket filter algorithm on a Cisco uBR7200 series router running Cisco IOS Release 12.1 EC:

```
Router(config)# interface cable 6/0
Router(config-if)# cable downstream rate-limit token-bucket
```

The following example shows how to apply the token-bucket filter algorithm on a Cisco uBR10012 router running Cisco IOS Release 12.2 BC:

```
Router(config)# interface cable 5/1/0
Router(config-if)# cable downstream rate-limit token-bucket shaping
```

The following example shows how to use token-bucket shaping with a **max-delay** of 256 milliseconds on a Cisco uBR7100 series router:

```
Router(config)# interface cable 1/0
Router(config-if)# cable downstream rate-limit token-bucket shaping max-delay 256
```

**Related Commands**

| Command                          | Description                                                                    |
|----------------------------------|--------------------------------------------------------------------------------|
| <b>cable service class</b>       | Sets the parameters for a DOCSIS 1.1 cable service class.                      |
| <b>cable upstream rate-limit</b> | Sets DOCSIS rate limiting for an upstream port on a cable interface line card. |

## cable downstream rf-power

To set the RF power output level on an integrated upconverter on the Cisco uBR7100 series router, Cisco uBR-MC16U, Cisco uBR-MC28U, or Cisco uBR10-MC5X20S/U cable interface line card, or Cisco RF Gateway 10, use the **cable downstream rf-power** command in cable interface configuration mode. To reset the RF output power level to its default value, use the **no** form of this command.

**cable downstream rf-power** {*power-level* | **hccp-delta** *diff-pwr* | **hccp-override** *override-pwr*}

**no cable downstream rf-power** {*power-level* | **hccp-delta** *diff-pwr* | **hccp-override** *override-pwr*}

| Syntax Description                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>power-level</i>                       | RF output power level in dBmV. The valid range is from 45 to 63 dBmV.<br><br><b>Note</b> The official range for acceptable power levels in the DOCSIS specification is 50 to 61 dBmV. Cisco cable interfaces exceed the DOCSIS standard, but power levels outside the DOCSIS standards should be used only in lab and test environments.                                                                                                                                                                                                                                                                                                                    |
| <b>hccp-delta</b> <i>diff-pwr</i>        | (Protect interfaces only) When using N+1 Hotstandby Connection-to-Connection Protocol (HCCP) redundancy, the protect interface adds the <i>diff-pwr</i> value to the current power value of the working interface when a switchover occurs. This allows the router to accommodate relative differences between the RF power levels in working and protect interfaces. The valid value for <i>diff-pwr</i> ranges from -12 to +12 dBmV.                                                                                                                                                                                                                      |
| <b>hccp-override</b> <i>override-pwr</i> | (Protect interfaces only) When using N+1 HCCP redundancy, the protect interface uses the override power value instead of the power value of the working interface when a switchover occurs. This allows the router to accommodate absolute differences between the RF power levels in working and protect interfaces. The valid value for <i>override-pwr</i> ranges from 45 to 63 dBmV.<br><br><b>Note</b> The official range for acceptable power levels in the DOCSIS specification is 50 to 61 dBmV. Cisco cable interfaces exceed the DOCSIS standard, but power levels outside the DOCSIS standards should be used only in lab and test environments. |

| Command Default |                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------|
|                 | 50 dBmV for the Cisco uBR7100 series router                                                  |
|                 | 55 dBmV for the Cisco uBR-MC5X20S cable interface line card on the Cisco uBR10012 router     |
|                 | 55 dBmV for the Cisco uBR-MC16U and Cisco uBR-MC28U cable interface line cards               |
|                 | 55 dBmV for the Cisco uBR10-MC5X20U-D cable interface line card on the Cisco uBR10012 router |

### Cisco RF Gateway10

The default values set are as follows for the different stacking levels:

1:1 stacking—44 dBmV

2:1 stacking—47 dBmV

4:1 stacking—40 dBmV

**Command Modes**

Interface configuration (config-if).

QAM interface and subinterface configuration (config-if and config-subif)

**Command History**

| Release                    | Modification                                                                                                                                                                                    |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(5)EC1                 | This command was introduced to provide support on the integrated upconverter on the Cisco uBR7100 series router.                                                                                |
| 12.2(11)CY,<br>12.2(11)BC3 | Support was added for the Cisco uBR10-MC5X20S cable interface line card on the Cisco uBR10012 router.                                                                                           |
| 12.2(15)CX                 | Support was added for the Cisco uBR-MC16U and Cisco uBR-MC28U cable interface line cards.                                                                                                       |
| 12.2(15)BC2                | Support was added for the Cisco uBR-MC5X20U cable interface line card. Support was also added for the <b>hccp-delta</b> and <b>hccp-override</b> options.                                       |
| 12.3BC                     | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                      |
| 12.2(33)SCA                | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                              |
| 12.2(44)SQ                 | This command was integrated into Cisco IOS Release 12.2(44)SQ. Support for the Cisco RF Gateway 10 was added. <b>hccp-delta</b> and <b>hccp-override</b> options are not supported.             |
| 12.2(33)SCC4               | Support for the following keywords was moved to the global redundancy configuration mode: <ul style="list-style-type: none"> <li>• <b>hccp-delta</b></li> <li>• <b>hccp-override</b></li> </ul> |

**Usage Guidelines****Note**

In Cisco IOS Release 12.2(33)SCC4, the support for the **hccp-delta** and **hccp-override** keywords is moved from the interface configuration mode to the global redundancy configuration mode. You can now configure these keyword options using the **member subslot** command.

The **hccp-delta** and **hccp-override** options can be configured only on a protect interface (an interface that has been configured with the **hccp protect** command). However, it is possible to manually edit a configuration file on a TFTP server to include these options on a working interface configuration, and then download that configuration to the router from the TFTP server.

If you manually edit the Cisco IOS configuration files, ensure that you specify these options only on protect interfaces. If you specify the **hccp-delta** or **hccp-override** option on a working interface, the router will modify the configured downstream power with the given power delta or override value.

**Cisco RF Gateway 10**

The stacking level on Cisco RFGW-10 are as follows:

- 1:1 stacking—30 dBmV ~ 61 dBmV, default is 44 dBmV
- 2:1 stacking—30 dBmV ~ 57 dBmV, default is 47 dBmV
- 4:1 stacking—30 dBmV ~ 53 dBmV, default is 40 dBmV

The official range for acceptable power levels in the DOCSIS standard depends on the stacking level. The DOCSIS levels are as follows:

1:1 stacking—52 dBmV ~ 60 dBmV

2:1 stacking—48 dBmV ~ 56 dBmV

4:1 stacking—44 dBmV ~ 52 dBmV

**Note**

Cisco cable interfaces exceed the DOCSIS standard, but power levels outside the DOCSIS standards should be used only in lab and test environments.

Executing port level commands such as **cable downstream annex**, **cable downstream modulation**, **cable downstream stacking**, **cable downstream frequency**, and **cable downstream rf-power** at the QAM channel level modifies all the QAM channels on that port.

**Examples**

The following example shows how to configure the integrated upconverter on a Cisco uBR7100 series router for an RF output power level of 45 dBmV:

```
Router(config)# cable interface 1/0
Router(config-if)# cable downstream rf-power 45
```

The following example shows how to configure the first integrated upconverter on a Cisco uBR10012 router for an RF output power level of 53 dBmV:

```
Router(config)# cable interface 5/1/0
Router(config-if)# cable downstream rf-power 53
```

The following commands show how to configure the first integrated upconverter to the default power level of 55 dBmV on the Cisco uBR10012 router:

```
Router(config)# cable interface 5/1/0
Router(config-if)# no cable downstream rf-power
Router(config-if)# exit
```

The following example shows how to configure a protect interface to add 3 dBmV to the current working RF power level when a switchover occurs:

```
Router(config)# cable interface 6/0/0
Router(config-if)# cable downstream rf-power hccp-delta 3
Router(config-if)# exit
```

The following example shows how to configure a protect interface to use an RF power level of 48 dBmV instead of the current working RF power level when a switchover occurs:

```
Router(config)# cable interface 6/0/0
Router(config-if)# cable downstream rf-power hccp-override 48
Router(config-if)# exit
```

**Note**

The **hccp-delta** and **hccp-override** commands configure the power of the protect interface at the time of the switchover. To display the RF power currently being used on a cable interface, use the **show controller cable** command.



**Cisco RF Gateway 10**

The following example shows how to configure the integrated upconverter on a Cisco RFGW-10 for an RF output power level of 50 dBmV:

```
Router(config)# interface qam 3/1.1
Router(config-subif)# cable downstream rf-power 50
```

**Related Commands**

| Command                                  | Description                                                                                                              |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>cable downstream frequency</b>        | Configures the cable downstream center frequency on the integrated upconverter.                                          |
| <b>cable downstream rf-shutdown</b>      | Enables or disables the RF output from the integrated upconverter.                                                       |
| <b>debug cable upconverter</b>           | Enables debugging of the internal upconverter operation.                                                                 |
| <b>show controllers cable</b>            | Displays status and configuration information for the cable interface, including the integrated upconverter, if present. |
| <b>show controllers qam</b>              | Displays cable downstream information configured on the QAM channel and port.                                            |
| <b>show running-config interface qam</b> | Displays the running configuration of the QAM interface.                                                                 |

# cable downstream rf-shutdown

To disable the RF output from an integrated upconverter on the Cisco uBR7100 series router, Cisco uBR-MC16U, Cisco uBR-MC28U or the Cisco uBR10-MC5X20S/U cable interface line card, use the **cable downstream rf-shutdown** command in cable interface configuration mode. To enable the RF output on the integrated upconverter, use the **no** form of this command.

**cable downstream rf-shutdown**

**no cable downstream rf-shutdown**

**Syntax Description** This command has no arguments or keywords.

**Command Default** RF output is disabled.

**Command Modes** Interface configuration—cable interface only (config-if)

| Command History | Release                    | Modification                                                                                                       |
|-----------------|----------------------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(5)EC1                 | This command was introduced to provide support on the integrated upconverter on the Cisco uBR7100 series router.   |
|                 | 12.2(11)CY,<br>12.2(11)BC3 | Support was added for the Cisco uBR10-MC5X20S cable interface line card on the Cisco uBR10012 router.              |
|                 | 12.2(15)CX                 | Support was added for the Cisco uBR-MC16U and Cisco uBR-MC28U cable interface line cards.                          |
|                 | 12.2(15)BC2                | Support was added for the Cisco uBR-MC5X20U cable interface line card.                                             |
|                 | 12.3BC                     | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                 | 12.2(33)SCA                | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** By default, the integrated upconverter on the Cisco uBR7100 series router, Cisco uBR-MC16U, Cisco uBR-MC28U, and the Cisco uBR10-MC5X20S/U cable interface line cards is disabled, and the downstream port does not output any signal. The **no** form of this command enables the integrated upconverter, allowing it to output an RF signal through the downstream port.

However, before a valid DOCSIS downstream signal can be output, the following must also be done:

- A valid downstream RF frequency must be configured using the **cable downstream frequency** cable interface command.
- The cable interface must be enabled using the **no shutdown** command on the cable interface.



**Note**

This command does not affect the IF output from the DS0 downstream port on the Cisco uBR7100 series router. The Cisco uBR10-MC5X20S/U, Cisco uBR-MC16U, and Cisco uBR-MC28U cable interface line cards do not provide IF output for their downstream ports.

## Examples

The following example enables the integrated upconverter on the Cisco uBR7100 series router:

```
Router(config)# cable interface 1/0
Router(config-if)# no cable downstream rf-shutdown
```

The following example enables the second integrated upconverter on a Cisco uBR-MC5X20S cable interface line card in the Cisco uBR10012 router:

```
Router(config)# cable interface 7/0/1
Router(config-if)# no cable downstream rf-shutdown
```

The following commands must also be given before the DS0 RF port can transmit a valid RF signal:

```
Router(config-if)# cable downstream frequency center-frequency
Router(config-if)# no shutdown
Router(config-if)# exit
router(config)#
```

## Related Commands

| Command                           | Description                                                                                                                                |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable downstream frequency</b> | Configures the downstream center frequency on the integrated upconverter.                                                                  |
| <b>cable downstream rf-power</b>  | Configures the desired RF output power on the integrated upconverter.                                                                      |
| <b>debug cable upconverter</b>    | Enables debugging of the internal upconverter operation.                                                                                   |
| <b>show controllers cable</b>     | Displays status and configuration information for the cable interface, including information about the integrated upconverter, if present. |

# cable dsg



## Note

Effective with Cisco IOS Release 12.3(13a)BC, the **cable dsg** command is not available in Cisco IOS software.

To enable the DOCSIS Set-Top Gateway (DSG) on a cable interface on a Cisco CMTS router, and to configure its tunnel-mapping parameters, use the **cable dsg** command in interface or subinterface configuration mode. To remove the DSG tunnel from the interface, use the **no** form of this command.

**cable dsg** *tunnel-MAC-address group-ip-address CA-vendor-name*

**no cable dsg** *tunnel-MAC-address group-ip-address CA-vendor-name*

## Syntax Description

|                           |                                                                                                                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>tunnel-MAC-address</i> | Well-known MAC address for the DSG tunnel.                                                                                                                                                                                      |
| <i>group-ip-address</i>   | Multicast group IP address for the DSG stream.                                                                                                                                                                                  |
| <i>CA-vendor-name</i>     | Name for the Conditional Access (CA) vendor that owns the DSG tunnel. This parameter is a string up to 7 characters in length and should match the vendor of the CA server. A maximum of four vendors per router are supported. |

## Command Default

No DSG tunnels are defined.

## Command Modes

Interface (config-if) and subinterface configuration (config-subif) for cable interfaces only

## Command History

| Release     | Modification                                                                           |
|-------------|----------------------------------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced for the Cisco uBR7100 series and Cisco uBR7246VXR routers. |
| 12.3(9a)BC  | This command was introduced for the Cisco uBR10012 router.                             |
| 12.3(13a)BC | This command was removed.                                                              |

## Usage Guidelines

This command enables DSG operations on the cable interface, creating a DSG tunnel that uses the specified IGMP multicast address and well-known MAC address.

The *tunnel-MAC-address* could optionally be an Internet Group Management Protocol (IGMP) multicast address, using the algorithm for converting host group IP address to an Ethernet MAC address that is given in RFC 1112. If the MAC address is 0000.0000.0000, the DSG tunnel uses the algorithm given in RFC 1112 to derive the multicast address for the tunnel as follows:

An IP host group address is mapped to an Ethernet multicast address by placing the low-order 23-bits of the IP address into the low-order 23 bits of the Ethernet multicast address 01-00-5E-xx-xx-xx (hex). Because there are 28 significant bits in an IP host group address, more than one host group address may map to the same Ethernet multicast address.

For example, if you specify the command **cable dsg 0.0.0 228.9.9.9 AAA**, the command uses the IGMP IP address of 228.9.9.9 to generate the MAC address of 0100.5E09.0909 for the DSG tunnel. If the IGMP address were 228.129.9.9, the resulting MAC address would be 0100.5E01.0909.

You can specify only Global Scope (224.0.1.0 through 238.255.255.255) and Administratively Scoped (239.0.0.0 through 239.255.255.255) addresses. You cannot use Local Scope addresses (224.0.0.0 through 224.0.0.255).

Entering the **cable dsg** command also automatically configures the interface for the appropriate IGMP static group, using the **ip igmp static-group** command. Do not manually enter another **ip igmp static-group** command for this interface, because the system assumes that this IGMP configuration is for a separate configuration that cannot be used by the DSG subsystem.

**Note**

If any previously configured static groups exist on this interface, you should remove those other **ip igmp static-group** commands on a cable interface before you can enter the **cable dsg** command. If you do not remove those other groups, the **cable dsg** command displays a warning notifying you that you should remove them.

The **no cable dsg** command automatically removes the IGMP static group from the interface by issuing the **no ip igmp static-group** command. Do not manually remove this static group yourself.

In addition, you must have enabled Protocol Independent Multicast (PIM) on the cable interface, using the **ip pim** interface configuration command, before enabling and configuring DSG operations. The DOCSIS Set-Top Gateway feature supports the following PIM modes:

- **ip pim sparse-mode** command—Configures sparse mode of operation.
- **ip pim sparse-dense-mode** command—Configures the interface for either sparse mode or dense mode of operation, depending on the mode in which the multicast group is operating.
- **ip pim dense-mode** command—Configures dense mode of operation.

**Limitations and Restrictions**

The DOCSIS Set-Top Gateway feature also has the following limitations:

- If using bundled interfaces, configure the DSG configurations only on the master interface, not on the slave interfaces. However, when DSG has been properly configured on the master interface, DSG traffic can flow across both the master and slave interfaces.
- If using subinterfaces, you must configure the DSG tunnels only on subinterfaces. When DSG tunnels are configured on a subinterface, you cannot also configure the tunnels on the main interface. If you configure DSG tunnels on both the main interface and subinterfaces, the main interface can drop packets.

We also recommend putting all DSG configurations on the same, single subinterface. Although you can configure DSG tunnels on multiple subinterfaces, this is not guaranteed to be supported in future software releases.

- You can configure up to four separate Conditional Access (CA) vendors per router.
- You can configure a maximum of eight DSG tunnels (as identified by the well-known MAC address) per CA vendor, for a maximum possible total of 32 DSG tunnels per router.
- Each CA vendor can have one or more DSG tunnels on each cable interface, but each DSG tunnel must be using a separate IP multicast address.
- IP multicast routing should be enabled on the router, using the **ip multicast-routing** command.
- Multicast rate-limiting can be enabled optionally on a cable interface that is configured for DSG operations, using the **ip multicast rate-limit out group-list** command.

- For best performance, fast switching of IP multicast should be enabled on incoming and outgoing interfaces, using the **ip mroute-cache** command.
- You cannot use the same IP multicast groups for both DSG traffic and for other IP multicast traffic. If an IP multicast group is being used for DSG traffic, do not use the **ip igmp static-group** command to manually configure that same IP multicast group for other, non-DSG traffic.
- Different CA vendors cannot share IP multicast addresses. Each vendor must use a unique set of IP multicast addresses, and after an IP multicast address is assigned to a DSG tunnel, that same address cannot be used for any other purpose. However, all other multicast addresses and groups can still be used on the interface for other multicast applications.
- DSG-related IP unicast traffic is not supported. The CMTS receives the unicast traffic from the DSG network controllers, but it does not forward that traffic to the set-top boxes.
- DSG traffic should be less than 2.048 Mbps per vendor, so as to conform to the DSG specifications.
- DSG does not support Baseline Privacy Interface (BPI)-encrypted IP multicast streams.

**Note**

In Cisco IOS Release 12.2(15)BC2, N+1 HCCP high availability redundancy does not preserve the DSG traffic and configuration after a switchover. If you configure a cable interface for both N+1 HCCP redundancy and for DSG operations, DSG traffic does not continue after a switchover.

**Examples**

The following example shows how to configure a cable interface on a Cisco uBR7246VXR router to enable the DSG feature on cable interface 3/0, using a well-known MAC address of 0001.0002.0003 and a destination IP address of 225.2.3.4:

```
interface cable 3/0
ip pim dense-mode
ip multicast rate-limit out group-list 123 1024
cable dsg 1.2.3 225.2.3.4 CCC
```

**Note**

The above configuration also automatically configures the interface with the appropriate **ip igmp static-group** command (**ip igmp static-group 225.3.4.5**). This command will appear in the interface configuration and should not be removed manually.

The following example shows the error message that appears if you specify a broadcast IP address that has already been added to the router's IGMP database. This entry typically would have been created manually on the router or dynamically by a customer premise equipment (CPE) device that is attached to a cable modem on the cable network.

```
interface cable 3/0
cable dsg 1.1.1 224.3.3.10 cisco
```

Multicast group 224.3.3.10 is already in use on the interface Cable3/0, please retry.

The following example shows how to delete a DSG tunnel on a cable interface:

```
interface cable 4/0
no cable dsg 0020.0020.0020 230.8.8.8 abc
```

4d17h: DSG: interface Cable5/0 left the igmp static group 230.8.8.8.

4d17h: DSG: tunnel 0020.0020.0020 is removed

4d17h: DSG: the specified DSG entry has been removed.

The following example shows the error message that appears when a unicast IP address is specified instead of a multicast IP address:

```
interface cable 4/0
 cable dsg 1.1.1 192.168.13.10 cisco
```

Only multicast is supported for current version.

**Related Commands**

| Command                    | Description                                                                       |
|----------------------------|-----------------------------------------------------------------------------------|
| <b>cable dsg keepalive</b> | Enables keepalive messages over DSG tunnels on all cable interfaces.              |
| <b>debug cable dsg</b>     | Enables general, DCD, or packet-related debugging for DSG on a Cisco CMTS router. |
| <b>show cable dsg</b>      | Displays the current DSG tunneling parameters.                                    |

## cable dsg cfr

To define and enable Advanced-Mode DOCSIS Set-Top Gateway (A-DSG) classifiers on a Cisco CMTS router, use the **cable dsg cfr** command in global configuration mode. To remove one or more specified A-DSG classifiers from a Cisco CMTS router, use the **no** form of this command. To disable one or more specified A-DSG classifiers but retain their configuration, use the **disable** form of this command.

**cable dsg cfr** *index* [**dest-ip** {*ipaddr* | *hostname*}] [**tunnel** *index*] [**dest-ports** *start end*] [**priority** *priority*] [**src-ip** {*ipaddr* | *hostname*} [**src-prefix-len** *length*]] [**disable** | **enable**] [**in-dcd** {**yes** | **no** | **ignore**}]

**no cable dsg cfr** *index*

| Syntax Description                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>index</i>                                             |  | DSG index. The valid range is from 1 to 65535.                                                                                                                                                                                                                                                                                                                                                   |
| <i>ipaddr</i>                                            |  | (Optional) Destination multicast group IP address. This argument is required for a new classifier, but optional for an existing classifier.                                                                                                                                                                                                                                                      |
| <i>hostname</i>                                          |  | (Optional) Fully-qualified domain name (FQDN). This argument is required for a new classifier, but optional for an existing classifier.                                                                                                                                                                                                                                                          |
| <b>tunnel</b> <i>index</i>                               |  | (Optional) Defines a tunnel index identified by a number from 1 to 65535.                                                                                                                                                                                                                                                                                                                        |
| <b>dest-ports</b> <i>start end</i>                       |  | (Optional) Defines the destination TCP/UDP with the starting and ending port ranging from 0 to 65535.                                                                                                                                                                                                                                                                                            |
| <b>priority</b> <i>priority</i>                          |  | (Optional) Defines the classifier priority.                                                                                                                                                                                                                                                                                                                                                      |
| <b>src-ip</b> <i>ipaddr</i>                              |  | (Optional) Defines the source IP address and prefix length, if desired.                                                                                                                                                                                                                                                                                                                          |
| <b>src-prefix-len</b> <i>length</i>                      |  | (Optional) Defines the source prefix length.                                                                                                                                                                                                                                                                                                                                                     |
| <b>disable</b>                                           |  | (Optional) Disables the classifier. This is the default.                                                                                                                                                                                                                                                                                                                                         |
| <b>enable</b>                                            |  | (Optional) Enables the classifier.                                                                                                                                                                                                                                                                                                                                                               |
| <b>in-dcd</b> { <b>yes</b>   <b>no</b>   <b>ignore</b> } |  | (Optional) Defines whether to include, exclude, or ignore the DSG rules of the Downstream Channel Descriptor (DCD) message. <ul style="list-style-type: none"> <li><b>yes</b>—Includes the classifier.</li> <li><b>no</b>—Excludes the classifier.</li> <li><b>ignore</b>—Excludes the classifier from the DCD message and enables the DSG rule regardless of the tunnel MAC address.</li> </ul> |

**Command Default** The A-DSG classifiers are undefined by default on a Cisco CMTS router. When configured, A-DSG classifiers are enabled by default.

**Command Modes** Global configuration (config)



**Command History**

| Release      | Modification                                                                                                                    |
|--------------|---------------------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC  | This command was introduced to support A-DSG 1.1 on the Cisco uBR10012 router and Cisco uBR7200 series routers.                 |
| 12.3(17a)BC  | The <b>in-dcd</b> keyword option was added.                                                                                     |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.              |
| 12.2(33)SCD5 | This command was modified. The <b>ignore</b> option was added to the <b>in-dcd</b> keyword.                                     |
| 12.2(33)SCG  | This command was modified. The <i>hostname</i> argument was added to specify the FQDN for the destination or source IP address. |

**Usage Guidelines**

The **cable dsg cfr** command creates an index to which one or several A-DSG classifiers apply. The A-DSG classifiers can only be mapped to one DSG tunnel. The Cisco CMTS router applies the classifier parameters to the packets received from the DSG server in order to assign the packet to the appropriate DSG tunnel.

When you use the **in-dcd yes** option, the classifiers are also included in the DSG rules as part of the DCD message.

When you use the **in-dcd ignore** option, the DSG rule is enabled after bypassing the RFC-1112 MAC address check, and the DSG classifier is not included in the DCD message.

The **no** form of the **cable dsg cfr** command disables the DSG rule if the tunnel MAC address is derived from the RFC-1112.

During the software downgrade process, if the software does not support the **in-dcd ignore** option then the **in-dcd yes** option is used.

**Examples**

The following example shows how to configure an A-DSG classifier on a Cisco CMTS router:

```
Router(config)# cable dsg cfr 1
Router(config)# cable dsg cfr 2 dest-ip 224.10.10.101 tunnel 1 dest-port 0 65535 priority 1
Router(config)# cable dsg cfr 2 dest-ip 224.10.10.102 dest-ports 22 777 enable in-dcd yes
Router(config)# cable dsg cfr 3 dest-ip 224.10.10.103 dest-ports 22 777 src-ip ciscovideo.com
```

**Associated Features**

The **cable dsg cfr** command is used to configure the [Advanced Mode DOCSIS Set-Top Gateway 1.2 for the Cisco CMTS Routers](#) feature.

**Related Commands**

| Command                          | Description                                                                                      |
|----------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable dsg chan-list</b>       | Configures the A-DSG downstream channel list on a Cisco CMTS router.                             |
| <b>cable dsg client-list</b>     | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router.       |
| <b>cable dsg tg channel</b>      | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router. |
| <b>cable dsg tg channel uuid</b> | Configures the upstream channel IDs for an A-DSG tunnel group on a Cisco CMTS router.            |

| Command                                  | Description                                                                         |
|------------------------------------------|-------------------------------------------------------------------------------------|
| <b>cable dsg tg channel vendor-param</b> | Specifies a vendor-specific group for an A-DSG tunnel group on a Cisco CMTS router. |
| <b>cable dsg timer</b>                   | Configures the A-DSG timer on a Cisco CMTS router.                                  |
| <b>cable dsg tunnel</b>                  | Creates A-DSG tunnels on a Cisco CMTS router.                                       |
| <b>cable dsg tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.       |
| <b>cable dsg vendor param</b>            | Configures vendor-specific parameters for an A-DSG on a Cisco CMTS router.          |

# cable dsg chan-list

To configure the Advanced-mode DOCSIS Set-Top Gateway (A-DSG) downstream channel list on a CMTS router, use the **cable dsg chan-list** command in global configuration mode. To remove the A-DSG channel list, use the **no** form of this command.

**cable dsg chan-list** *list-index* **index** *entry-index* **freq** *freq*

**no cable dsg chan-list** *list-index* **index** *entry-index* **freq** *freq*

## Syntax Description

|                                 |                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------|
| <i>list-index</i>               | Defines the DSG channel list and index identifier as a number in the range 1 to 65535.        |
| <b>index</b> <i>entry-index</i> | Defines the DSG channel frequency entry index as a number in the range 1 to 65535.            |
| <b>freq</b> <i>freq</i>         | Defines the center frequency of the downstream channel in the range 47000000 to 862000000 Hz. |

## Command Default

A-DSG channel lists are disabled and undefined by default.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced on the Cisco uBR10012 router and Cisco uBR7200 series routers.                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The channel list entry created with this command can be associated to a downstream interface and be included in the Downstream Channel Descriptor (DCD) message by using the **cable downstream dsg chan-list** command.

## Examples

The following example shows A-DSG channel list global configurations on a Cisco CMTS router:

```
cable dsg chan-list 1 index 1 freq 47000000
cable dsg chan-list 1 index 2 freq 125000000
cable dsg chan-list 1 index 3 freq 555000000
cable dsg chan-list 2 index 1 freq 47000000
cable dsg chan-list 2 index 2 freq 125000000
cable dsg chan-list 2 index 3 freq 555000000
```

**Related Commands**

| <b>Command</b>                           | <b>Description</b>                                                                               |
|------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable dsg cfr</b>                     | Defines and enables A-DSG classifiers on a Cisco CMTS router.                                    |
| <b>cable dsg client-list</b>             | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router.       |
| <b>cable dsg tg channel</b>              | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router. |
| <b>cable dsg tg channel ucid</b>         | Configures the upstream channel IDs for an A-DSG tunnel group on a Cisco CMTS router.            |
| <b>cable dsg tg channel vendor-param</b> | Specifies a vendor-specific group for an A-DSG tunnel group on a Cisco CMTS router.              |
| <b>cable dsg timer</b>                   | Configures the A-DSG timer on a Cisco CMTS router.                                               |
| <b>cable dsg tunnel</b>                  | Creates A-DSG tunnels on a Cisco CMTS router.                                                    |
| <b>cable dsg tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.                    |
| <b>cable dsg vendor param</b>            | Configures vendor-specific parameters for A-DSG on a Cisco CMTS router.                          |

# cable dsg client-list

To configure client parameters for Advanced-mode DOCSIS Set-Top Gateway (A-DSG) on a Cisco CMTS router, use the **cable dsg client-list** command in global configuration mode. This command configures the client parameters and the associated DSG rule. To remove this configuration, use the **no** form of the command.

```
cable dsg client-list client-list-id id-index id {application-id app-id | broadcast [broadcast-id] |
 ca-system-id sys-id | mac-addr mac-addr}
```

```
no cable dsg client-list client-list-id id-index id {application-id app-id | broadcast [broadcast-id]
 | ca-system-id sys-id | mac-addr mac-addr}
```

| Syntax Description                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>client-list-id</i>                    |  | Defines an identifier for the <i>DSG client list</i> as a number from 1 to 65535.                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>id-index</b> <i>id</i>                |  | Defines the DSG client index identifier as a number from 1 to 65535.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>application-id</b> <i>app-id</i>      |  | Defines the DSG client type application identifier as a hexadecimal value from 1 to FFFF.                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>broadcast</b> [ <i>broadcast-id</i> ] |  | Defines an optional DSG client type broadcast value: <ul style="list-style-type: none"> <li>1—Contains Society of Cable Telecommunications Engineers (SCTE) 65.</li> <li>2—Contains SCTE 18.</li> <li>3—Contains OpenCable Application Platform (OCAP) Object Carousel (OCAP 1.0)</li> <li>4—Contains OpenCable Common Download Carousel (OC-CD).</li> <li>5 to 55534—Reserved for future use.</li> <li>55535 to 65535—Reserved for Multiplier Service Operator (MSO)-specific use.</li> </ul> |
| <b>ca-system-id</b> <i>sys-id</i>        |  | Defines the DSG client type CA system identifier as a hexadecimal value from 1 to FFFF.                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>mac-addr</b> <i>mac-addr</i>          |  | Defines the DSG client type hexadecimal MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Command Default** Client lists for A-DSG are not configured by default.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                                                               |
|-----------------|-------------|------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced to support A-DSG on the Cisc uBR10012 router and Cisco uBR7200 series routers. |

| Release      | Modification                                                                                                                                 |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC2 | The <i>broadcast-id</i> argument was added. Support for the same DSG client identifier to be associated with multiple DSG tunnels was added. |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                           |

**Usage Guidelines**

Beginning in Cisco IOS Release 12.3(17a)BC2, the same DSG client identifier can be associated with multiple DSG tunnels.

**Examples**

The following example shows global configuration for four A-DSG client lists:

```
cable dsg client-list 1 id-index 1 broadcast
cable dsg client-list 2 id-index 2 application-id FFFF
cable dsg client-list 3 id-index 3 ca-system-id EEEE
cable dsg client-list 4 id-index 4 mac-addr 0100.5e0a.0a04
```

**Related Commands**

| Command                                  | Description                                                                                      |
|------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable dsg cfr</b>                     | Defines and enables A-DSG classifiers on a Cisco CMTS router.                                    |
| <b>cable dsg chan-list</b>               | Configures the A-DSG downstream channel list on a Cisco CMTS router.                             |
| <b>cable dsg tg channel</b>              | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router. |
| <b>cable dsg tg channel ucid</b>         | Configures the upstream channel IDs for an A-DSG tunnel group on a Cisco CMTS router.            |
| <b>cable dsg tg channel vendor-param</b> | Specifies a vendor-specific group for an A-DSG tunnel group on a Cisco CMTS router.              |
| <b>cable dsg timer</b>                   | Configures the A-DSG timer on a Cisco CMTS router.                                               |
| <b>cable dsg tunnel</b>                  | Creates A-DSG tunnels on a Cisco CMTS router.                                                    |
| <b>cable dsg tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.                    |
| <b>cable dsg vendor param</b>            | Configures vendor-specific parameters for A-DSG on a Cisco CMTS router.                          |

# cable dsg keepalive

**Note**

Effective with Cisco IOS Release 12.3(13a)BC, the **cable dsg keepalive** command is not available in Cisco IOS software.

To enable keepalive messages over DOCSIS Set-Top Gateway (DSG) tunnels on all cable interfaces, use the **cable dsg keepalive** command in global configuration mode. To disable DSG keepalives, use the **no** form of this command.

**cable dsg keepalive**

**no cable dsg keepalive**

**Syntax Description**

This command has no arguments or keywords.

**Command Default**

Keepalive messages are disabled (**no cable dsg keepalive**).

**Command Modes**

Global configuration (config)

**Command History**

| Release     | Modification                                                                           |
|-------------|----------------------------------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced for the Cisco uBR7100 series and Cisco uBR7246VXR routers. |
| 12.3(9a)BC  | This command was introduced for the Cisco uBR10012 router.                             |
| 12.3(13a)BC | This command was removed.                                                              |

**Usage Guidelines**

By default, a Cisco CMTS router does not send keepalive messages on any DSG tunnels. When keepalives are enabled using the **cable dsg keepalive** command, the Cisco CMTS router sends one keepalive message each second on each DSG tunnel on each downstream. In Cisco IOS Release 12.2(15)BC2, the keepalive packet is a null packet.

**Note**

Do not enable DSG keepalive messages unless your application and DSG set-top boxes require them.

**Tip**

Use the **show cable dsg** command to display whether keepalive messages are enabled.

**Examples**

The following example shows how to enable DSG keepalives on all cable interfaces on the router:

```
cable dsg keepalive
```

The following example shows how to disable DSG keepalives on all cable interfaces, which is the default configuration:

**■ cable dsg keepalive**

```
no cable dsg keepalive
```

**Related Commands**

| Command                | Description                                                                     |
|------------------------|---------------------------------------------------------------------------------|
| <b>cable dsg</b>       | Enables DSG on a cable interface, and configures its tunnel-mapping parameters. |
| <b>debug cable dsg</b> | Enables the display of debugging messages for the operation of the DSG feature. |
| <b>show cable dsg</b>  | Displays the current DSG tunneling parameters.                                  |



# cable dsg name-update-interval

To update fully-qualified domain name (FQDN) classifiers on a Cisco CMTS router based on the DNS server record, use the **cable dsg name-update-interval** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable dsg name-update-interval** *minutes*

**no cable dsg name-update-interval** *minutes*

## Syntax Description

*minutes*

Interval in minutes to check the DNS server for any FQDN classifier changes. The valid range is from 1 to 60. The default value is 5.

## Command Default

The default value of 5 minutes is configured.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCG | This command was introduced. |

## Usage Guidelines

Use the **cable dsg name-update-interval** command to configure the DSG name process feature. This feature supersedes the Time to Live (TTL) value associated with the DNS server while obtaining the latest DNS server record.

## Examples

The following example shows how to specify the DSG name interval on the Cisco CMTS router:

```
Router(config)# cable dsg name-update-interval 3
```

## Associated Features

The **cable dsg-name-update-interval** command is used to configure the [Advanced Mode DOCSIS Set-Top Gateway 1.2 for the Cisco CMTS Routers](#) feature.

## Related Commands

| Command                   | Description                                                   |
|---------------------------|---------------------------------------------------------------|
| <b>cable dsg cfr</b>      | Defines and enables A-DSG classifiers on a Cisco CMTS router. |
| <b>show cable dsg cfr</b> | Displays DSG classifier details.                              |

# cable dsg tg

To associate a group of Advanced-Mode DOCSIS Set-Top Gateway (A-DSG) tunnels to one or more downstream interfaces on a Cisco CMTS router, use the **cable dsg tg** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable dsg tg** *group-id* [**channel** *channel\_ID* | **priority** *DSG-rule-priority* [**enable** | **disable**] | **ucid** *ID1* [*ID2 ID3 ID4*] | **vendor-param** *vendor-group-ID*]

**no cable dsg tg** *group-id*

## Syntax Description

|                                            |                                                                                                       |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <i>group-id</i>                            | A-DSG tunnel group identifier. The valid range is from 1 to 65535.                                    |
| <i>channel-id</i>                          | (Optional) The downstream channel identifier. The valid range is from 1 to 65535.                     |
| <b>priority</b> <i>DSG-rule-priority</i>   | (Optional) Specifies the A-DSG rule priority. The valid range is from 0 to 255.                       |
| <b>enable</b>                              | (Optional) Enables the specified A-DSG tunnel group.                                                  |
| <b>disable</b>                             | (Optional) Disables the specified A-DSG tunnel group. This is the default.                            |
| <b>ucid</b> <i>upstream-channel-ID</i>     | (Optional) Specifies the upstream channel ID. You can specify a maximum of four upstream channel IDs. |
| <b>vendor-param</b> <i>vendor-group-ID</i> | (Optional) Specifies the vendor specific parameters group ID. The valid range is from 1 to 65535.     |

## Defaults

The A-DSG tunnel group configuration is enabled by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                                                                                                                                        |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC2 | This command was introduced to support A-DSG version 1.2 on the Cisco uBR10012 router and Cisco uBR7200 series routers.                                                             |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                  |
| 12.2(33)SCG  | The <b>channel</b> keyword was made optional, and the following new keywords were added: <ul style="list-style-type: none"> <li><b>ucid</b></li> <li><b>vendor-param</b></li> </ul> |

## Usage Guidelines

The **cable dsg tg** command establishes the configuration of the tunnel group. You can use the **disable** and **enable** keyword forms of the command to deactivate and activate the tunnel group configuration.

**Examples**

The following example shows configuration and activation of a DSG tunnel group with channel ID, A-DSG rule priority, upstream channel ID, and vendor parameter group ID:

```
Router(config)# cable dsg tg 1
Router(config)# cable dsg tg 1 channel 2
Router(config)# cable dsg tg 1 channel 2 enable
Router(config)# cable dsg tg 1 channel 2 priority 3
Router(config)# cable dsg tg 1 channel 2 priority 3 enable
Router(config)# cable dsg tg 1 channel 2 ucid 1
Router(config)# cable dsg tg 1 channel 2 vendor-param 30
```

**Related Commands**

| Command                                  | Description                                                                                |
|------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>cable dsg cfr</b>                     | Defines and enables A-DSG classifiers on a Cisco CMTS router.                              |
| <b>cable dsg chan-list</b>               | Configures the A-DSG downstream channel list on a Cisco CMTS router.                       |
| <b>cable dsg client-list</b>             | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router. |
| <b>cable dsg tg channel ucid</b>         | Configures the upstream channel IDs for an A-DSG tunnel group on a Cisco CMTS router.      |
| <b>cable dsg tg channel vendor-param</b> | Specifies a vendor-specific group for an A-DSG tunnel group on a Cisco CMTS router.        |
| <b>cable dsg timer</b>                   | Configures the A-DSG timer on a Cisco CMTS router.                                         |
| <b>cable dsg tunnel</b>                  | Creates A-DSG tunnels on a Cisco CMTS router.                                              |
| <b>cable dsg tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.              |

# cable dsg tg channel

To associate a group of Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnels to one or more downstream interfaces on a Cisco CMTS router, use the **cable dsg tg channel** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable dsg tg** *group-id* **channel** *channel-id* [**priority** *rule-priority*] [**enable** | **disable**]

**no cable dsg tg** *group-id* **channel** *channel-id* [**priority** *rule-priority*]

## Syntax Description

|                                      |                                                                       |
|--------------------------------------|-----------------------------------------------------------------------|
| <i>group-id</i>                      | Specifies the A-DSG tunnel group identifier as a number from 1–65535. |
| <i>channel-id</i>                    | Specifies the downstream channel identifier as a number from 1–65535. |
| <b>priority</b> <i>rule-priority</i> | Specifies the A-DSG rule priority as a number from 0–255.             |
| <b>enable</b>                        | Enables the specified A-DSG tunnel group.                             |
| <b>disable</b>                       | Disables the specified A-DSG tunnel group. This is the default.       |

## Defaults

The A-DSG tunnel group configuration is enabled by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                                                                            |
|--------------|-------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC2 | This command was introduced to support A-DSG version 1.2 on the Cisco uBR10012 router and Cisco uBR7200 series routers. |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.      |

## Usage Guidelines

The **cable dsg tg channel** command establishes the configuration of the tunnel group. You can use the **disable** and **enable** keyword forms of the command to deactivate and activate the tunnel group configuration. To remove the configuration, use the **no** form of the command.

## Examples

The following example shows configuration and activation of a tunnel group with ID of 1 and channel ID of 2:

```
Router(config)# cable dsg tg 1 channel 2
```

## Related Commands

| Command                      | Description                                                                                |
|------------------------------|--------------------------------------------------------------------------------------------|
| <b>cable dsg cfr</b>         | Defines and enables A-DSG classifiers on a Cisco CMTS router.                              |
| <b>cable dsg chan-list</b>   | Configures the A-DSG downstream channel list on a Cisco CMTS router.                       |
| <b>cable dsg client-list</b> | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router. |

| Command                                  | Description                                                                                      |
|------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable dsg tg channel</b>              | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router. |
| <b>cable dsg tg channel ucid</b>         | Configures the upstream channel IDs for an A-DSG tunnel group on a Cisco CMTS router.            |
| <b>cable dsg tg channel vendor-param</b> | Specifies a vendor-specific group for an A-DSG tunnel group on a Cisco CMTS router.              |
| <b>cable dsg timer</b>                   | Configures the A-DSG timer on a Cisco CMTS router.                                               |
| <b>cable dsg tunnel</b>                  | Creates A-DSG tunnels on a Cisco CMTS router.                                                    |
| <b>cable dsg tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.                    |

# cable dsg tg channel ucid

To configure the upstream channel IDs for an Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnel group on a Cisco CMTS router, use the **cable dsg tg channel ucid** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable dsg tg** *group-id* **channel** *channel-id* **ucid** *upstream-id* [*upstream-id* . .]

**no cable dsg tg** *group-id* **channel** *channel-id* **ucid** *upstream-id* [*upstream-id* . .]

## Syntax Description

|                    |                                                                       |
|--------------------|-----------------------------------------------------------------------|
| <i>group-id</i>    | Specifies the A-DSG tunnel group identifier as a number from 1–65535. |
| <i>channel-id</i>  | Specifies the downstream channel identifier as a number from 1–65535. |
| <i>upstream-id</i> | Specifies one or more upstream channel IDs as a number from 1–8.      |

## Defaults

Upstream channel IDs are not defined by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                                                                            |
|--------------|-------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC2 | This command was introduced to support A-DSG version 1.2 on the Cisco uBR10012 router and Cisco uBR7200 series routers. |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.      |

## Usage Guidelines

The **cable dsg tg channel** command must be configured before this command is made available.

## Examples

The following example shows configuration of a tunnel group with ID of 1 and channel ID of 2, followed by configuration of the upstream channel IDs associated with the tunnel group:

```
Router(config)# cable dsg tg 1 channel 2
Router(config)# cable dsg tg 1 channel 2 ucid 1 2 3 4 5 6 7 8
```

## Related Commands

| Command                      | Description                                                                                      |
|------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable dsg cfr</b>         | Defines and enables A-DSG classifiers on a Cisco CMTS router.                                    |
| <b>cable dsg chan-list</b>   | Configures the A-DSG downstream channel list on a Cisco CMTS router.                             |
| <b>cable dsg client-list</b> | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router.       |
| <b>cable dsg tg channel</b>  | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router. |

| Command                                  | Description                                                                         |
|------------------------------------------|-------------------------------------------------------------------------------------|
| <b>cable dsd tg channel vendor-param</b> | Specifies a vendor-specific group for an A-DSG tunnel group on a Cisco CMTS router. |
| <b>cable dsd timer</b>                   | Configures the A-DSG timer on a Cisco CMTS router.                                  |
| <b>cable dsd tunnel</b>                  | Creates A-DSG tunnels on a Cisco CMTS router.                                       |
| <b>cable dsd tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.       |

# cable dsg tg channel vendor-param

To associate a vendor-specific group with an Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnel group on a Cisco CMTS router, use the **cable dsg tg channel vendor-param** command in global configuration mode. To remove this configuration, use the **no** form of this command.

```

cable dsg tg group-id channel channel-id vendor-param vendor-group

no cable dsg tg group-id channel channel-id vendor-param vendor-group

```

## Syntax Description

|                     |                                                                        |
|---------------------|------------------------------------------------------------------------|
| <i>group-id</i>     | Specifies the A-DSG tunnel group identifier as a number from 1–65535.  |
| <i>channel-id</i>   | Specifies the downstream channel identifier as a number from 1–65535.  |
| <i>vendor-group</i> | Specifies the A-DSG vendor-specific group ID as a number from 1–65535. |

## Defaults

The A-DSG vendor-specific group is not associated by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                                                                            |
|--------------|-------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC2 | This command was introduced to support A-DSG version 1.2 on the Cisco uBR10012 router and Cisco uBR7200 series routers. |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.      |

## Usage Guidelines

The **cable dsg tg channel** command must be configured before this command is made available. You also need to configure the vendor-specific parameter list using the **cable dsg vendor-param** command before you can associate it with the tunnel group.

## Examples

The following example shows configuration of the vendor-specific parameter list, followed by configuration of a tunnel group and ssociation with the defined vendor group 3:

```

! Configure the vendor-specific parameter list
cable dsg vendor-param 3 vendor 1 oui ABCDEC value 0101AB
!
! Configure the tunnel group and associate the vendor group to the tunnel
!
cable dsg tg 1 channel 2
cable dsg tg 1 channel 2 vendor-param 3

```



| Related Commands | Command                           | Description                                                                                      |
|------------------|-----------------------------------|--------------------------------------------------------------------------------------------------|
|                  | <b>cable dsg cfr</b>              | Defines and enables A-DSG classifiers on a Cisco CMTS router.                                    |
|                  | <b>cable dsg chan-list</b>        | Configures the A-DSG downstream channel list on a Cisco CMTS router.                             |
|                  | <b>cable dsg client-list</b>      | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router.       |
|                  | <b>cable dsg tg channel</b>       | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router. |
|                  | <b>cable dsg tg channel ucid</b>  | Configures the upstream channel IDs for an A-DSG tunnel group on a Cisco CMTS router.            |
|                  | <b>cable dsg timer</b>            | Configures the A-DSG timer on a Cisco CMTS router.                                               |
|                  | <b>cable dsg tunnel</b>           | Creates A-DSG tunnels on a Cisco CMTS router.                                                    |
|                  | <b>cable dsg tunnel srv-class</b> | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.                    |
|                  | <b>cable dsg vendor-param</b>     | Configures A-DSG vendor-specific parameters on a Cisco CMTS router.                              |

# cable dsg tg default-priority

To change the default channel priority for a tunnel group on the Cisco CMTS router, use the **cable dsg tg default-priority** command in global configuration mode. To set the channel priority back to the default value of zero, use the **no** form this command.

**cable dsg tg** *group-id* **default-priority** *DSG-rule-priority*

**no cable dsg tg** *group-id* **priority** *DSG-rule-priority*

## Syntax Description

|                                                     |                                                                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <i>group-id</i>                                     | Advanced-Mode DOCSIS Set-Top Gateway (A-DSG) tunnel group identifier. The valid range is from 1 to 65535.             |
| <b>default-priority</b><br><i>DSG-rule-priority</i> | Specifies the DSG rule priority of the downstream channels. The valid range is from 0 to 255. The default value is 0. |

## Command Default

The default value of 0 is used as the channel priority for a tunnel group.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCG | This command was introduced. |

## Usage Guidelines

All channels that are configured after setting the default priority use the same priority value.

## Examples

The following example shows how to specify the default channel priority for a tunnel group on the Cisco CMTS router:

```
Router(config)# cable dsg tg 1 default-priority 20
```

## Associated Features

The **cable dsg tg default-priority** command is associated with the [Advanced Mode DOCSIS Set-Top Gateway 1.2 for the Cisco CMTS Routers](#) feature.

## Related Commands

| Command              | Description                                                   |
|----------------------|---------------------------------------------------------------|
| <b>cable dsg cfr</b> | Defines and enables A-DSG classifiers on a Cisco CMTS router. |

# cable dsg tg priority

To change the priority of existing Advanced-Mode DOCSIS Set-Top Gateway (A-DSG) channels in a tunnel group on a Cisco CMTS router, use the **cable dsg tg priority** command in global configuration mode. To set the DSG rule priority of all existing channels in a tunnel group to the default value of zero, use the **no** form of this command.

**cable dsg tg** *group-id* **priority** *DSG-rule-priority*

**no cable dsg tg** *group-id* **priority** *DSG-rule-priority*

|                    |                                          |                                                                                                                       |
|--------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>group-id</i>                          | A-DSG tunnel group identifier. The valid range is from 1 to 65535.                                                    |
|                    | <b>priority</b> <i>DSG-rule-priority</i> | Specifies the DSG rule priority of the downstream channels. The valid range is from 0 to 255. The default value is 0. |

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCG | This command was introduced. |

|                  |                                                                                                                                                                                                                                                             |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command does not impact the downstream channels configured after setting the priority. The <b>no</b> form of the <b>cable dsg tg priority</b> command sets the DSG rule priority of all existing channels in a tunnel group to the default value of 0. |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows how to specify the DSG rule priority for all existing A-DSG channels in a tunnel group on a Cisco CMTS router:<br><br>Router(config)# <b>cable dsg tg 1 priority 20</b> |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                     |                                                                                                                                                                |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Associated Features | The <b>cable dsg tg priority</b> command is used to configure the <a href="#">Advanced Mode DOCSIS Set-Top Gateway 1.2 for the Cisco CMTS Routers</a> feature. |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                  |                           |                                                               |
|------------------|---------------------------|---------------------------------------------------------------|
| Related Commands | Command                   | Description                                                   |
|                  | <b>cable dsg cfr</b>      | Defines and enables A-DSG classifiers on a Cisco CMTS router. |
|                  | <b>show cable dsg cfr</b> | Displays DSG classifier details.                              |

# cable dsg timer

To configure the Advanced-mode DOCSIS Set-Top Gateway (A-DSG) timer entry to be associated to the downstream channel, and encoded into the downstream channel descriptor (DCD) message on a Cisco CMTS router, use the **cable dsg timer** command in global configuration mode. To remove the cable A-DSG timer, use the **no** form of this command.

**cable dsg timer** *index* [**Tdsg1** *Tdsg1*] [**Tdsg2** *Tdsg2*] [**Tdsg3** *Tdsg3*] [**Tdsg4** *Tdsg4*]

**no cable dsg timer** *index* [**Tdsg1** *Tdsg1*] [**Tdsg2** *Tdsg2*] [**Tdsg3** *Tdsg3*] [**Tdsg4** *Tdsg4*]

## Syntax Description

|                           |                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------|
| <i>index</i>              | Defines the DSG timer and associates to an index for the downstream channel as a number from 1 to 65535. |
| <b>Tdsg1</b> <i>Tdsg1</i> | (Optional) DSG Initialization Timeout (Tdsg1) setting from 1 to 65535.                                   |
| <b>Tdsg2</b> <i>Tdsg2</i> | (Optional) DSG Operational Timeout (Tdsg2) setting from 1 to 65535.                                      |
| <b>Tdsg3</b> <i>Tdsg3</i> | (Optional) DSG Two-Way Retry Timer (Tdsg3) setting from 0 to 65535.                                      |
| <b>Tdsg4</b> <i>Tdsg4</i> | (Optional) DSG One-Way Retry Timer (Tdsg4) setting from 0 to 65535.                                      |

## Defaults

The A-DSG timer is not defined by default.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced to support A-DSG 1.1 on the Cisco uBR10012 router and Cisco uBR7200 series routers.    |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The A-DSG timer entry can associated to the downstream to encode into the DCD message.

## Examples

The following example shows global configuration of three A-DSG timers:

```
cable dsg timer 1 Tdsg1 1 Tdsg2 2 Tdsg3 3 Tdsg4 4
cable dsg timer 2 Tdsg1 2 Tdsg2 22 Tdsg3 33 Tdsg4 44
cable dsg timer 3 Tdsg1 2 Tdsg2 600 Tdsg3 300 Tdsg4 1800
```

## Related Commands

| Command                    | Description                                                          |
|----------------------------|----------------------------------------------------------------------|
| <b>cable dsg cfr</b>       | Defines and enables A-DSG classifiers on a Cisco CMTS router.        |
| <b>cable dsg chan-list</b> | Configures the A-DSG downstream channel list on a Cisco CMTS router. |

| Command                                  | Description                                                                                      |
|------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable dsg client-list</b>             | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router.       |
| <b>cable dsg tg channel</b>              | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router. |
| <b>cable dsg tg channel ucid</b>         | Configures the upstream channel IDs for an A-DSG tunnel group on a Cisco CMTS router.            |
| <b>cable dsg tg channel vendor-param</b> | Specifies a vendor-specific group for an A-DSG tunnel group on a Cisco CMTS router.              |
| <b>cable dsg tunnel</b>                  | Creates A-DSG tunnels on a Cisco CMTS router.                                                    |
| <b>cable dsg tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.                    |
| <b>cable dsg vendor param</b>            | Configures vendor-specific parameters for A-DSG on a Cisco CMTS router.                          |

# cable dsg tunnel

To create Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnels on a Cisco CMTS router, use the **cable dsg tunnel** command in global configuration mode. To remove this configuration, use the **no** form of this command. To disable A-DSG tunnels, use the **disable** form of this command.

**cable dsg tunnel** *tunnel-id* **mac-addr** *mac-addr* **tg** *tunnel-group-id* **clients** *number* [**disable** | **enable**]

**no cable dsg tunnel** *tunnel-id* **mac-addr** *mac-addr* **tg** *tunnel-group-id* **clients** *number*

## Syntax Description

|                                  |                                                                                   |
|----------------------------------|-----------------------------------------------------------------------------------|
| <i>tunnel-id</i>                 | Defines the DSG tunnel with an identifier as a number from 1–65535.               |
| <b>mac-addr</b> <i>mac-addr</i>  | Specifies the multicast group MAC address in hexadecimal format.                  |
| <b>tg</b> <i>tunnel-group-id</i> | Associates a tunnel group ID as a number from 1–65535.                            |
| <b>clients</b> <i>number</i>     | Specifies the client to which the configuration applies as a number from 1–65535. |
| <b>disable</b>                   | (Optional) Disables the specified A-DSG tunnel.                                   |
| <b>enable</b>                    | (Optional) Enables the specified A-DSG tunnel.                                    |

## Defaults

A-DSG tunnels are not configured by default, but are enabled by default once configured.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                            |
|-------------|-------------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced to support A-DSG version 1.1 on the Cisco uBR10012 router and Cisco uBR7200 series routers. |
| 12.3(17a)BC | The <b>tg</b> and <b>clients</b> keywords were added in support of A-DSG version 1.2.                                   |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.      |

## Usage Guidelines

The **cable dsg tunnel** command establishes the configuration of the tunnel. You can use the **disable** and **enable** keyword forms of the command to deactivate and activate the tunnel configuration. To remove the configuration, use the **no** form of the command.

Each tunnel is mapped to the destination MAC address and once defined, can be associated with a configured QoS service class name using the **cable dsg tunnel srv-class** command.

## Examples

The following example shows configuration of four A-DSG tunnels on a Cisco CMTS router:

```
cable dsg tunnel 1 mac-addr 0100.5e0a.0a01
cable dsg tunnel 2 mac-addr 0100.5e0a.0a02
cable dsg tunnel 3 mac-addr 0100.5e0a.0a03
cable dsg tunnel 4 mac-addr 0100.5e0a.0a04
```

**Related Commands**

| Command                                  | Description                                                                                      |
|------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable dsg cfr</b>                     | Defines and enables A-DSG classifiers on a Cisco CMTS router.                                    |
| <b>cable dsg chan-list</b>               | Configures the A-DSG downstream channel list on a Cisco CMTS router.                             |
| <b>cable dsg client-list</b>             | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router.       |
| <b>cable dsg tg channel</b>              | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router. |
| <b>cable dsg tg channel ucid</b>         | Configures the upstream channel IDs for an A-DSG tunnel group on a Cisco CMTS router.            |
| <b>cable dsg tg channel vendor-param</b> | Specifies a vendor-specific group for an A-DSG tunnel group on a Cisco CMTS router.              |
| <b>cable dsg timer</b>                   | Configures the A-DSG timer on a Cisco CMTS router.                                               |
| <b>cable dsg tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.                    |
| <b>cable dsg vendor param</b>            | Configures vendor-specific parameters for A-DSG on a Cisco CMTS router.                          |

# cable dsg tunnel srv-class

To associate a cable service class with an Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnel on a Cisco CMTS router, use the **cable dsg tunnel srv-class** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable dsg tunnel** *tunnel-id* **srv-class** *class-name*

**no cable dsg tunnel** *tunnel-id* **srv-class** *class-name*

## Syntax Description

|                   |                                                                        |
|-------------------|------------------------------------------------------------------------|
| <i>tunnel-id</i>  | Identifies the DSG tunnel with an identifier as a number from 1–65535. |
| <i>class-name</i> | Specifies the name of a configured cable service class.                |

## Defaults

Cable service classes are not configured by default or associated with a DSG tunnel.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC  | This command was introduced on the Cisco uBR10012 router and Cisco uBR7200 series routers.                         |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCC1 | This command was modified to reflect the change in behavior of the command when the default MQoS is configured.    |

## Usage Guidelines

The A-DSG tunnel and tunnel group must be created first before the **cable dsg tunnel srv-class** command becomes available to associate the tunnel with a configured QoS service class.

## Examples

The following example shows the configuration of a cable service class named “test” on a Cisco CMTS router, followed by the association of that test cable service class with a DSG tunnel:

```
Router(config)# cable service class 1 name test
Router(config)# cable service class 1 downstream
Router(config)# cable service class 1 max-rate 20000
Router(config)# cable service class 1 min-rate 3000
Router(config)# cable dsg client-list 1 id-index 1 mac-addr 0050.4d00.0007
Router(config)# cable dsg tg 1 channel 1
Router(config)# cable dsg tunnel 1 mac-addr 0050.4d00.0007 tg 1 clients 1
Router(config)# cable dsg tunnel 1 srv-class test
```

When the service class name is configured without the default MQoS configuration, the following error message is displayed and the configuration is rejected prompting the user to configure the default MQoS.

```
Router(config)# cable dsg tunnel 1 srv-class test
```



The default mqos doesn't exist, please, create one and then reconfigure service class name to tunnel 1

```
Router(config)#
```

When the last service class name is not configured, the following error message is displayed prompting the user to remove the default MQoS (if not needed.)

```
Router(config)# no cable dsg tunnel 1 srv-class test
```

There is no DSG tunnel associated with a service class name, so, remove the default mqos if not needed

```
Router(config)#
```

## Related Commands

| Command                                  | Description                                                                                      |
|------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable service class</b>               | Configures parameters for a DOCSIS service class on a Cisco CMTS router.                         |
| <b>cable dsg client-list</b>             | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router.       |
| <b>cable dsg tg channel</b>              | Associates a group of A-DSG tunnels to one or more downstream interfaces on a Cisco CMTS router. |
| <b>cable dsg tg channel ucid</b>         | Configures the upstream channel IDs for an A-DSG tunnel group on a Cisco CMTS router.            |
| <b>cable dsg tg channel vendor-param</b> | Specifies a vendor-specific group for an A-DSG tunnel group on a Cisco CMTS router.              |
| <b>cable dsg timer</b>                   | Configures the A-DSG timer on a Cisco CMTS router.                                               |
| <b>cable dsg tunnel</b>                  | Creates A-DSG tunnels on a Cisco CMTS router.                                                    |
| <b>cable dsg tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.                    |
| <b>cable dsg vendor param</b>            | Configures vendor-specific parameters for A-DSG on a Cisco CMTS router.                          |

# cable dsg vendor param

To configure Advanced-mode DOCSIS Set-top Gateway (A-DSG) vendor-specific parameters on a Cisco CMTS router, use the **cable dsg vendor-param** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable dsg vendor-param** *group-id* **vendor** *vendor-index* **oui** *oui* **value** *value-in-TLV*

**no cable dsg vendor-param** *group-id* **vendor** *vendor-index* **oui** *oui* **value** *value-in-TLV*

## Syntax Description

|                                   |                                                                   |
|-----------------------------------|-------------------------------------------------------------------|
| <i>group-id</i>                   | Defines the DSG vendor parameter and associates with a DSG group. |
| <b>vendor</b> <i>vendor-index</i> | Selects the DSG vendor and associated DSG index.                  |
| <b>oui</b> <i>oui</i>             | Selects the DSG Organizationally Unique Identifier (OUI) setting. |
| <b>value</b> <i>value-in-TLV</i>  | Sets the type/length value for the defined DSG vendor.            |

## Defaults

The A-DSG vendor-specific parameters are not defined by default.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced to support A-DSG on the Cisco uBR10012 router and Cisco uBR7200 series routers.        |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The vendor-specific parameters can be associated to the downstream to encode into the Downstream Channel Descriptor (DCD) message.

To associate a vendor parameter list with a tunnel group, use the **cable dsg tg channel vendor-param** command. The same vendor parameter list can be associated with multiple tunnel groups.

## Examples

The following sample configuration illustrates global vendor parameters for A-DSG:

```
cable dsg vendor-param 1 vendor 1 oui ABCDEA value 0101AB
cable dsg vendor-param 2 vendor 1 oui ABCDEB value 0101AB
cable dsg vendor-param 3 vendor 1 oui ABCDEC value 0101AB
```

## Related Commands

| Command                    | Description                                                          |
|----------------------------|----------------------------------------------------------------------|
| <b>cable dsg cfr</b>       | Defines and enables A-DSG classifiers on a Cisco CMTS router.        |
| <b>cable dsg chan-list</b> | Configures the A-DSG downstream channel list on a Cisco CMTS router. |

| Command                                  | Description                                                                                |
|------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>cable dsd client-list</b>             | Configures the A-DSG client parameters and the associated DSG rule on a Cisco CMTS router. |
| <b>cable dsd tg channel vendor-param</b> | Associates a vendor-specific group with an A-DSG tunnel group on a Cisco CMTS router.      |
| <b>cable dsd timer</b>                   | Configures the A-DSG timer on a Cisco CMTS router.                                         |
| <b>cable dsd tunnel</b>                  | Creates A-DSG tunnels on a Cisco CMTS router.                                              |
| <b>cable dsd tunnel srv-class</b>        | Associates a cable service class with an A-DSG tunnel on a Cisco CMTS router.              |

# cable ds-max-burst

To enable a specialized Enhanced-Rate Bandwidth Allocation (ERBA) feature on the Cisco uBR10012 router with Performance Routing Engine 2 (PRE2) or Performance Routing Engine 4 (PRE4) modules, use the **cable ds-max-burst** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable ds-max-burst** [**burst-threshold** *threshold* **peak-rate** *peak-rate*]

**no cable ds-max-burst**

## Syntax Description

|                                         |                                                                                                                                                                                                                                                              |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>burst-threshold</b> <i>threshold</i> | Optional keyword and value defines the burst threshold in Kbytes, with a valid range from 64 Kbyte to 2 GB. By default, this setting is 1MB. This value is used to compare with the per-service flow maximum traffic burst value as defined in DOCSIS 2.0.   |
| <b>peak-rate</b> <i>peak-rate</i>       | Peak Rate in Kbps. The default value of peak-rate is zero, which represents the line rate.<br><br>The <i>peak-rate</i> value is a global value and is applied to all the service flows created after the configuration of <b>cable ds-max-burst</b> command. |

## Defaults

This configuration is disabled by default on the Cisco uBR10012 router. This command is not required nor supported on the Cisco uBR7100 Series, Cisco uBR7225VXR and Cisco uBR7246VXR router.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                                               |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced in support of ERBA on the Cisco uBR10012 router with PRE2 modules.                                             |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                            |
| 12.2(33)SCB | The <i>peak-rate</i> option was introduced and support for Performance Routing Engine 4 (PRE4) was added in Cisco IOS Release 12.2(33)SCB. |

## Usage Guidelines

Cisco IOS Release 12.3(21)BC introduces the ERBA feature on the Cisco uBR10012 CMTS with Performance Routing Engine 2 (PRE2) modules. The ERBA feature in Cisco IOS release 12.3(21)BC is characterized by the following enhancements:

- Enables support for the DOCSIS1.1 *Downstream Maximum Transmit Burst* parameter on the Cisco CMTS by using **cable ds-max-burst** configuration command. This command is not supported on the Cisco uBR7225VXR, Cisco uBR7246VXR and the Cisco uBR7100 Series routers, as this parameter is supported by default.
- Allows DOCSIS1.0 modems to support the DOCSIS1.1 *Downstream Maximum Transmit Burst* parameter by using DOCSIS QoS profile. This feature uses the **cable qos pro max-ds-burst** configuration command.

**Note**

The **cable ds-max-burst** and related commands are supported strictly on the Cisco uBR10012 router with PRE2 or PRE4 modules on Cisco IOS Release 12.3(21)BC or later releases.

To displays service flows on the Cisco uBR10012 router with PRE2 or PRE4, and identifies which service flows have maximum burst enabled, use the following command in privileged EXEC mode:

**show cr10k-rp cable slot/subslot/port sid service-flow ds**

- slot = 5 to 8
- subslot = 0 or 1
- port = 0 to 4 (depending on the cable interface)

For additional information about the **cable qos profile** command and configuring QoS profiles, refer to the following documents on Cisco.com:

- *DOCSIS 1.1 for the Cisco CMTS*

[http://www.cisco.com/en/US/docs/cable/cmts/feature/guide/ufg\\_docs.html](http://www.cisco.com/en/US/docs/cable/cmts/feature/guide/ufg_docs.html)

**Examples**

The following example illustrates typical command sequence when using this command to configure ERBA on the Cisco uBR10012 router, with a sample burst threshold setting:

```
Router> enable
Router# configure terminal
Router(config)# cable ds-max-burst burst-threshold 2048 peak-rate 1000
Router(config)# Ctrl^Z
Router# show cr10k-rp cable 7/0/0 sid service-flow ds
```

When this feature is enabled, new service flows with burst size larger than the burst threshold are supported. However, the existing service flows are not affected.

When this feature is disabled, no new service flows are configured with the *Downstream Maximum Transmit Burst* parameter—the **cable ds-max-burst** command settings. However, the existing service flows are not affected.

The following example illustrates configuration of the ERBA maximum burst for the specified service flow:

```
Router# sh cr10k-rp c7/0/0 1 service-flow ds
RP SFID LC SFID Conform Exceed Conform Exceed Total QID
 Xmit Pkts Xmit Pkts Drop Pkts Drop Pkts Pkts
32930 10 41 0 0 0 41 131349
Forwarding interface: Modular-Cable1/0/0:0
32931 13 0 0 0 0 0 131350
Forwarding interface: Modular-Cable1/0/0:0
```

**Related Commands**

| Command                                        | Description                                                                                                                   |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos profile</b>                       | Configures a QoS profile.                                                                                                     |
| <b>show cable qos permission</b>               | Displays the status of permissions for changing QoS tables for a cable router.                                                |
| <b>show cable qos profile</b>                  | Displays the QoS profiles that have been defined.                                                                             |
| <b>show cr10k-rp cable sid service-flow ds</b> | Displays service flows on the Cisco uBR10012 router with PRE2, and identifies which service flows have maximum burst enabled. |

# cable ds-resiliency

To reserve a resiliency bonding group or wideband (WB) interface for a line card on the Cisco CMTS, use the **cable ds-resiliency** command in interface configuration mode. To remove this setting, use the **no** form of this command.

**cable ds-resiliency**

**no cable ds-resiliency**

## Command Default

None

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCG | This command was introduced. |

## Usage Guidelines

Remove all existing configuration commands from the WB interface when setting aside that interface as a WB resiliency bonding group.

The **cable ds-resiliency** command is used in conjunction with the **cable resiliency ds-bonding** command to configure the Downstream Resiliency Bonding Group feature.

## Examples

The following example shows how to reserve a wideband cable interface in slot 5, subslot 1, and port 2 for a resiliency bonding group:

```
Router(config) interface wideband-cable 5/1/2:0
Router(config-if) # cable ds-resiliency
```

## Associated Features

The **cable ds-resiliency** command is used to configure the following feature:

[Downstream Resiliency Bonding Group](#)

## Related Commands

| Command                            | Description                                                                                |
|------------------------------------|--------------------------------------------------------------------------------------------|
| <b>cable resiliency ds-bonding</b> | Enables the Downstream Resiliency Bonding Group feature on the Cisco CMTS router.          |
| <b>show cable modem resiliency</b> | Displays resiliency status of the cable modem in resiliency mode on the Cisco CMTS router. |
| <b>show cable resiliency</b>       | Displays all information about the resiliency bonding groups on the Cisco CMTS router.     |

# cable dynamic-bw-sharing

To enable dynamic bandwidth sharing (DBS) on a specific modular cable or wideband cable interface, use the **cable dynamic-bw-sharing** command in interface configuration mode. To disable DBS on the interface and revert to static bandwidth sharing, use the **no** form of this command.

**cable dynamic-bw-sharing**

**no cable dynamic-bw-sharing**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Dynamic bandwidth sharing is disabled and static bandwidth sharing is enabled.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                                                             |
|-------------|--------------------------------------------------------------------------|
| 12.3(23)BC1 | This command was introduced.                                             |
| 12.2(33)SCB | This command was integrated into Cisco IOS release 12.2(33)SCB.          |
| 12.2(33)SCE | The command default was changed. The DBS mode is now enabled by default. |

## Usage Guidelines

DBS may be configured on a modular cable or wideband cable interface only when the interface is administratively down. Additionally, the interface must be administrative down when using the **no** form of this command to disable dynamic bandwidth sharing.



### Note

Starting with Cisco IOS Release 12.2(33)SCE, the DBS mode is enabled by default, on the WB/MC/IC interfaces. To disable the DBS mode, configure the **no cable dynamic-bw-sharing** command.

## Examples

The following example enables dynamic bandwidth sharing on a modular cable interface using the **cable dynamic-bw-sharing** command:

```
Router(config)# interface modular-cable 1/0/0:1
Router(config-if)# shutdown
Router(config-if)# cable dynamic-bw-sharing
Router(config-if)# no shutdown
```

The following example enables dynamic bandwidth sharing on a wideband cable interface using the **cable dynamic-bw-sharing** command:

```
Router(config)# interface wideband-cable 1/0/0:0
Router(config-if)# shutdown
Router(config-if)# cable dynamic-bw-sharing
Router(config-if)# no shutdown
```

**Related Commands**

| Command                           | Description                                                                                                      |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>cable rf-bandwidth-percent</b> | Enables either static or dynamic bandwidth sharing for a modular cable (MC) interface.                           |
| <b>cable rf-channel</b>           | Associates an RF channel on a Wideband SPA with a wideband channel and allocates bandwidth.                      |
| <b>debug cr10k-rp dbs-queue</b>   | Displays debug information for dynamic bandwidth sharing (DBS) on the Cisco uBr10012 universal broadband router. |
| <b>show pxf cable controller</b>  | Displays information about the RF channel Versatile Traffic Management System (VTMS) links and link queues.      |
| <b>show pxf cpu queue</b>         | Displays parallel express forwarding (PXF) queueing and link queue statistics.                                   |



# cable dynamic-qos trace

To enable the call trace functionality on the Cisco CMTS router for the PacketCable or PacketCable Multimedia (PCMM) service subscribers, use the **cable dynamic-qos trace** command in global configuration mode. To disable this configuration, use the **no** form of this command.

**cable dynamic-qos trace** *subscriber-number*

**no cable dynamic-qos trace**

| Syntax Description | <i>subscriber-number</i> Number of subscribers for a PacketCable or PCMM service. The valid range is from 1 to 20. |
|--------------------|--------------------------------------------------------------------------------------------------------------------|
|--------------------|--------------------------------------------------------------------------------------------------------------------|

| Command Default | None |
|-----------------|------|
|-----------------|------|

| Command Modes | Global configuration (config) |
|---------------|-------------------------------|
|---------------|-------------------------------|

| Command History | Release                       | Modification                 |
|-----------------|-------------------------------|------------------------------|
|                 | Cisco IOS Release 12.2(33)SCF | This command was introduced. |

| Examples | The following example shows how to configure the call trace functionality on the Cisco uBR10012 router for the PacketCable or PCMM service subscribers: |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# cable dynamic-qos trace 12
```

| Related Commands | Command                                   | Description                                                                                                      |
|------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                  | <b>debug cable dynamic-qos subscriber</b> | Enables debugging of the call trace functionality on the Cisco CMTS router for a particular subscriber.          |
|                  | <b>debug cable dynamic-qos trace</b>      | Enables call trace debugging on the Cisco CMTS router for all the subscribers for whom call trace is configured. |
|                  | <b>show cable dynamic-qos trace</b>       | Displays the number of subscribers for whom call trace is enabled on the Cisco CMTS router.                      |

# cable dynamic-secret

To enable the Dynamic Shared Secret feature, so that Data-over-Cable Service Interface Specifications (DOCSIS) configuration files are verified with a Message Integrity Check (MIC) that has been created with a dynamically generated shared secret, use the **cable dynamic-secret** command in cable interface configuration mode. To disable this feature, use the **no** form of this command.

**cable dynamic-secret** {**lock** [*lock-qos*] | **mark** | **reject**} [**nocrypt**]

**no cable dynamic-secret**

| Syntax Description |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>lock</b>        |  | Allows CMs that do not pass MIC verification to come online, but with a restrictive quality of service (QoS) configuration that limits access to the network. The CMTS also locks those CMs so that they must be offline for 24 hours before being allowed to reregister with a valid DOCSIS configuration file. (You can also manually unlock a cable modem using the <b>clear cable modem lock</b> command.)                                                                                                                                                                                                                                                                               |
| <i>lock-qos</i>    |  | (Optional) Specifies the QoS profile to be assigned to the CM while it is locked. The valid range is 1 to 1023. If not specified, the CM is locked into a CMTS-created profile that limits both the upstream and downstream to 10 Kbps.<br><br><b>Note</b> The QoS profile must have already been created before it can be assigned using the <b>lock lock-qos</b> option.                                                                                                                                                                                                                                                                                                                   |
| <b>mark</b>        |  | Allows CMs to come online even if they do not present a DOCSIS configuration file with a valid CMTS MIC, but the CMTS prints a warning message and marks those CMs with an exclamation point (!) in the <b>show cable modem</b> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>reject</b>      |  | Rejects registration for CMs with DOCSIS configuration files that contain an invalid CMTS MIC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>nocrypt</b>     |  | (Optional) Specifies that the filename for DOCSIS configuration files should not be encrypted when the Cisco CMTS sends the files to CMs. The CMTS instead transmits the files using their original filenames.<br><br>The <b>nocrypt</b> option slightly decreases the security provided by the dynamic shared secret feature, but it allows the operator to poll the DOCSIS config file name listed by the cable modem for more convenient network management.<br><br><b>Note</b> A cable modem that is running unauthorized or hacked software can return whatever SNMP values the user desires. This information should therefore not be trusted by the billing and provisioning systems. |

## Defaults

The Dynamic Shared Secret feature is disabled. When enabled, the filenames for DOCSIS configuration files are encrypted.

## Command Modes

Interface configuration—cable interface only (config-if)

**Note**

Configuring the Dynamic Shared Secret feature on the master interface in a bundle also automatically configures it for all interfaces in the bundle.

**Command History**

| Release      | Modification                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1  | This command was introduced.                                                                                       |
| 12.2(15)BC1b | Support for the <b>nocrypt</b> option was added.                                                                   |
| 12.3BC       | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

The **cable dynamic-secret** configuration command automatically creates a unique DOCSIS shared secret on a per-modem basis, creating a one-time-use DOCSIS configuration file that is valid only for the current session. This ensures that a DOCSIS configuration file that has been downloaded for one cable modem can never be used by any other modem, nor can the same modem reuse this configuration file at a later time. This patent-pending feature is designed to guarantee that all registered modems are using only the QOS parameters that have been specified by the DOCSIS provisioning system for that particular modem at the time of its registration.

The **cable dynamic-secret** configuration command enhances the existing shared secret support on the Cisco CMTS by using a one-time, dynamically generated shared secret each time a cable modem registers. This prevents theft-of-service attacks in which users are able to substitute a DOCSIS configuration file that provides a higher-level of service during the registration phase.

The DOCSIS specification allows cable service providers to use a shared secret to create the CMTS MIC value that is stored in a DOCSIS configuration file. If a user attempts to register with the CMTS using a different or modified DOCSIS configuration file, the CMTS can compare the CMTS MIC value sent by the cable modem with the CMTS MIC it has calculated. If the two MIC values are different, the file has been modified.

The **cable dynamic-secret** command allows the CMTS to dynamically create the shared secret at the time that the cable modem is registering, and that shared secret is valid only for that particular session with that particular cable modem. A new dynamically generated shared secret is used each time each cable modem registers, which prevents users from guessing the shared secret and using it again to register with a modified DOCSIS configuration file.

If the cable modem's DOCSIS configuration file fails the CMTS MIC verification check, one of the following messages is displayed on the console:

```
%UBR7200-4-BADCFGFILE: Modem config file platinum.cm at C3/0: CMTS MIC Invalid
%UBR7200-4-BADCFGFILE: Modem config file platinum.cm at C3/0: No CMTS MIC
```

If the error message specifies that the reason for the failure is "CMTS MIC Invalid," the CMTS MIC was not encoded with the proper dynamically generated shared secret. If the reason is "No CMTS MIC," the DOCSIS configuration file did not contain any value for the CMTS MIC, which could indicate that the customer has attempted to bypass the DOCSIS security checks by creating the user's own DOCSIS configuration file without any MIC values.

**Note**

The Dynamic Shared Secret feature does not affect the use of the original shared secret or secondary shared secrets that are configured using the **cable shared-secondary-secret** and **cable shared-secret** commands. If these shared secrets are configured, the Cisco CMTS continues to use them to validate the original DOCSIS configuration file that is downloaded from the TFTP server. If the DOCSIS configuration file fails to pass the original or secondary shared secret verification checks, the cable modem is not allowed to register, and the Dynamic Shared Secret feature is not invoked for that particular cable modem.

**Note**

The Cisco uBR7100 series router does not support the Dynamic Shared Secret feature when running in MxU bridging mode.

The original filename for the DOCSIS configuration file is automatically encrypted by default to prevent unauthorized parties from obtaining any useful information from the filename, or from attempting to replace the original file with their own. This encryption can be disabled, using the **nocrypt** option, so that DOCSIS configuration files are sent using their original filenames.

**Note**

Do not use the **cable dynamic-secret** command along with the **ip tftp-source** command in Cisco IOS Release 12.2(15)BC1, because this could result in certain models of CMs not being able to come online but instead be stuck in the init(o) state. This restriction is removed in Cisco IOS Release 12.2(15)BC2 and later releases.

### Modes of Operation

The **cable dynamic-secret** command offers three different possible responses to cable modems that fail the CMTS MIC verification check:

- When the **mark** option is used, the CMTS allows CMs to come online even if they fail the CMTS MIC validity check. However, the CMTS also prints a warning message on the console and marks the cable modem in the **show cable modem** command with an exclamation point (!), so that this situation can be investigated. The following message is displayed on the console when such a CM registers with the Cisco CMTS:

```
06:53:57: %UBR7200-4-CMMARKED: Cable Modem 00ff.ffee.ddcc in C3/0 attempted theft of service
```

- When the **lock** option is used, the CMTS assigns a restrictive QoS configuration to CMs that fail the CMTS MIC validity check. If an optional *lock-qos* profile is specified, the CMTS assigns this profile to the CM while it is locked.

If the *lock-qos* profile is not specified, the CMTS uses a special QoS configuration that limits the network access for these CMs by restricting their downstream and upstream service flows to a maximum rate of 10 kbps. (If you do not specify the *lock-qos* profile, you must also allow cable modems to create QoS profiles, using the **cable qos permission** command. If you do not do this and use the **lock** option without specifying a particular QoS profile, locked cable modems will not be allowed to register until the lock clears or expires.)

If a customer resets their CM, the CM will reregister but still uses the restricted QoS profile. A locked CM continues with the restricted QoS profile until it goes offline and remains offline for at least 24 hours, at which point it is allowed to reregister with a valid DOCSIS configuration file. This option frustrates users who are repeatedly registering with the CMTS in an attempt to guess the shared secret, or to determine the details of the Dynamic Shared Secret security system.

In addition, the following message is displayed on the console when a CM is locked.

```
06:53:57: %UBR7200-4-CMLOCKED: Cable Modem 00ff.ffee.ddcc in C3/0 attempted theft of service
```

Locked cable modems are shown with an exclamation point (!) in the **show cable modem** displays:

Router# **show cable modem**

| MAC Address    | IP Address      | I/F       | MAC State  | Prim Sid | RxPwr (db) | Timing Offset | Num CPE | BPI Enb |
|----------------|-----------------|-----------|------------|----------|------------|---------------|---------|---------|
| 0010.9507.01db | 144.205.151.130 | C5/1/0/U5 | online(pt) | 1        | 0.25       | 938           | 1       | N       |
| 0080.37b8.e99b | 144.205.151.131 | C5/1/0/U5 | online     | 2        | -0.25      | 1268          | 0       | N       |
| 0002.fdfa.12ef | 144.205.151.232 | C6/1/0/U0 | online(pt) | 13       | -0.25      | 1920          | 1       | N       |
| 0002.fdfa.137d | 144.205.151.160 | C6/1/0/U0 | !online    | 16       | -0.50      | 1920          | 1       | N       |
| 0003.e38f.e9ab | 144.205.151.237 | C6/1/0/U0 | !online    | 3        | -0.50      | 1926          | 1       | N       |

Router#



**Tip** You can also manually clear the lock on a CM by using the **clear cable modem lock** command.

- When the **reject** option is used, the CMTS refuses to allow CMs to come online if they fail the CMTS MIC validity check. These cable modems appear with a MAC state of “reject(m)” in the displays generated by the **show cable modem** command. After a short timeout period, the CM attempts to reregister with the CMTS. The CM must register with a valid DOCSIS configuration file before being allowed to come online. When the CM does come online, the CMTS prints a warning message on the console and marks the cable modem in the **show cable modem** command with an exclamation point (!), so that this situation can be investigated.



**Tip**

Cisco recommends that you initially use the **mark** option, so that potential problems are identified without immediately interfering with users' ability to come online. After you identify and resolve these initial problems, reconfigure the cable interfaces with the **reject** or **lock** option to block problem cable modems that attempt to come online without a valid shared secret.



**Note**

To account for possible network problems, such as loss of packets and congestion, the Cisco CMTS will allow a cable modem to attempt to register twice before marking it as having failed the Dynamic Shared Secret authentication checks.

### Filename Encryption

By default, the **cable dynamic-secret** command encrypts the original filename for a DOCSIS configuration file when the Cisco CMTS transmits the file to the CM. This filename changes in a semi-random manner, making it difficult for users to predict the filename for the file that should be downloaded to the CM.

This does mean, however, that the filenames specified in the DHCP HELLO and ACK messages are different, and that the filenames on the CM and on the TFTP server are different. This could interfere with custom network management applications and scripts. If this is the case, you can disable the automatic filename encryption by adding the **nocrypt** option to the command.

The **nocrypt** option does slightly decrease the security provided by this feature, so this possibility should be weighed against the ability to more conveniently manage the network.

### Interaction with the TFTP Enforce Feature

The **cable tftp-enforce** command provides another layer of protection against theft-of-service attacks by requiring cable modems to download a DOCSIS configuration file through the CMTS cable interface before being allowed to register. When the **cable tftp-enforce** command is used with the **cable dynamic-secret** command, the TFTP enforce checks are done before the dynamic shared-secret checks. If a cable modem fails to download a DOCSIS configuration file through the CMTS, it is not allowed to register, regardless of the dynamic shared-secret checks.

### Displaying Rogue Cable Modems

Use the **show cable modem rogue** command to display the cable modems that have failed the dynamic shared-secret authentication checks:

```
Router# show cable modem rogue
```

| MAC Address    | Vendor  | Interface | SpooF Count | TFTP Dnld | Dynamic Secret                   |
|----------------|---------|-----------|-------------|-----------|----------------------------------|
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2           | Yes       | 45494DC933F8F47A398F69EE6361B017 |
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2           | Yes       | D47BCBB5494E9936D51CB0EB66EF0B0A |
| BBBB.7b43.aa7f | Vendor2 | C4/0/U5   | 2           | No        | 8EB196423170B26684BF6730C099D271 |
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2           | No        | DF8FE30203010001A326302430120603 |
| BBBB.7b43.aa7f | Vendor2 | C4/0/U5   | 2           | No        | 300E0603551D0F0101FF040403020106 |
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2           | Yes       | 820101002D1A264CE212A1BB6C1728B3 |
| DDDD.7b43.aa7f | Vendor4 | C4/0/U5   | 2           | Yes       | 7935B694DCA90BC624AC92A519C214B9 |
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2           | No        | 3AB096D00D56ECD07D9B7AB662451CFF |

```
Router#
```

If the CMTS cannot obtain the DOCSIS configuration file from the TFTP server, a message similar to the following is displayed on the console:

```
%UBR7200-4-NOCFGFILE: Cannot read modem config file platinum.cm from C3/0: <reason>
```

where the reason can be one of the following, depending on the error that the TFTP server reported:

- Compression Failed
- File too big
- Invalid Checksum
- Invalid IP address or hostname
- Uncompression Failed
- User Abort

### Examples

The following example shows how to configure a cable interface on a Cisco uBR7200 series router with the **mark** option, so that CMs that fail the MIC verification are allowed to register but are marked in the **show cable modem** displays so that their situation can be further investigated:

```
Router# configure terminal
Router(config)# interface cable 4/0
Router(config-if)# cable dynamic-secret mark
Router(config-if)# exit
Router(config)# exit
Router#
```

The following example shows how to configure the cable interface on a Cisco uBR7100 series router, so that CMs that fail the MIC verification are locked with a QoS profile that limits upstream and downstream service flows to 10 kbps:

```
Router# configure terminal
Router(config)# cable qos permission create
Router(config)# cable qos permission update
Router(config)# interface cable 1/0
Router(config-if)# cable dynamic-secret lock
Router(config-if)# exit
Router(config)# exit
Router#
```

**Note**

If you do not use the **cable qos permission** global configuration command to allow cable modems to create their own QoS profiles, the CMTS rejects this command and displays the following error message:

```
%Need permission for modems to create QoS profile
```

The following example shows how to configure a cable interface so that CMs that fail the MIC verification are locked with a specific QoS profile:

```
Router# configure terminal
Router(config)# interface cable 1/0
Router(config-if)# cable dynamic-secret lock 31
Router(config-if)# exit
Router(config)# exit
Router#
```

**Note**

If the specified QoS profile does not exist, the CMTS rejects this command and displays the following error message:

```
%Profile qos-id to lock modem does not exist
```

The following example shows how to configure a cable interface on a Cisco uBR7200 series router, so that CMs that fail the MIC verification are not allowed to register and must reregister with a valid DOCSIS configuration file before being allowed to come online:

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable dynamic-secret reject
Router(config-if)# exit
Router(config)# exit
Router#
```

The following example shows how to disable the Dynamic Shared Secret feature on a cable interface on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable 6/1/0
Router(config-if)# no cable dynamic-secret
Router(config-if)# exit
Router(config)# exit
Router#
```

| Related Commands | Command                              | Description                                                                                                                                                                                                          |
|------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dynamic-secret exclude</b>  | Excludes one or more specific cable modems from being processed by the Dynamic Shared Secret feature.                                                                                                                |
|                  | <b>cable shared-secondary-secret</b> | Configures one or more secondary shared secret keys that CMs can use to successfully process the DOCSIS configuration file and register with the CMTS.                                                               |
|                  | <b>cable shared-secret</b>           | Configures an authentication shared secret key that CMs must use to successfully process the DOCSIS configuration file and register with the CMTS.                                                                   |
|                  | <b>cable tftp-enforce</b>            | Requires that all CMs on a cable interface attempt to download a DOCSIS configuration file using Trivial File Transfer Protocol (TFTP) through the cable interface before being allowed to register and come online. |
|                  | <b>clear cable modem lock</b>        | Resets the lock on one or more CMs, and reinitializes them, so that they can reregister with a valid DOCSIS configuration file.                                                                                      |
|                  | <b>show cable modem rogue</b>        | Displays a list of cable modems that have been marked, locked, or rejected because they failed the dynamic shared-secret authentication checks.                                                                      |



# cable dynamic-secret exclude

To exclude one or more specific cable modems from being processed by the Dynamic Shared Secret feature, use the **cable dynamic-secret exclude** command in global configuration mode. To disable this feature, use the **no** form of this command.

**cable dynamic-secret exclude** {**modem** *mac-address* | **oui** *oui-id*}

**no cable dynamic-secret** {**modem** *mac-address* | **oui** *oui-id*}

## Syntax Description

|                                 |                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>modem</b> <i>mac-address</i> | Specifies the hardware (MAC) address of a specific individual cable modem to be excluded from the Dynamic Shared Secret feature. (You cannot specify a multicast MAC address.)                                                                           |
| <b>oui</b> <i>oui-id</i>        | Specifies the organization unique identifier (OUI) of a vendor, so that cable modems from this vendor are excluded from the Dynamic Shared Secret feature. The OUI should be specified as three hexadecimal bytes separated by either periods or colons. |

## Command Default

All modems are processed by the Dynamic Shared Secret feature when the feature is enabled.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(9a)BC  | This command was introduced.                                                                                       |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

When the **cable dynamic-secret** configuration command is configured on a cable interface, it automatically includes all cable modems that register on that interface. To exclude one or more cable modems from being processed by the Dynamic Shared Secret security checks, use the **cable dynamic-secret exclude** command in global configuration mode.

You might want to exclude cable modems from the Dynamic Shared Secret security checks if they need to download additional files from the TFTP server at registration time. For example, Cisco cable CPE devices, such as the Cisco uBR925 cable access router, can be instructed to download a Cisco IOS configuration file after downloading the DOCSIS configuration file.

However, when Dynamic Shared Secret checks are being used, the Cisco CMTS refuses to allow the cable modem to download any other files after the first successful download of the DOCSIS configuration file. To allow these cable modems to download their Cisco IOS configuration files, use the **cable dynamic-secret-exclude** command to exclude them from the Dynamic Shared Secret checks.

You can exclude either a specific cable modem by its MAC address, or all of a vendor's cable modems by their OUI value. Excluded cable modems must still register according to the normal DOCSIS provisioning procedures, but their DOCSIS configuration files are no longer verified by the Dynamic Shared Secret security checks.

**Tip**

When a cable modem is excluded from the Dynamic Shared Secret feature, the Dynamic Secret field in its **show cable modem verbose** display shows “Excluded”.

**Examples**

The following example shows how to exclude a specific cable modem, with the MAC address of 00d0.45ba.b34b, from being processed by the Dynamic Shared Secret feature:

```
Router# configure terminal
Router(config)# cable dynamic-secret exclude modem 00d0.45ba.b34b
Router(config)# exit
Router#
```

The following example shows how to exclude all cable modems with a vendor OUI value 00.01.B4 from being processed by the Dynamic Shared Secret feature:

```
Router# configure terminal
Router(config)# cable dynamic-secret exclude oui 00.01.B4
Router(config)# exit
```

**Related Commands**

| Command                              | Description                                                                                                                                                                         |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable dynamic-secret</b>          | Enables the Dynamic Shared Secret feature, so that DOCSIS configuration files are verified with a MIC that has been created with a dynamically generated shared secret.             |
| <b>cable shared-secondary-secret</b> | Configures one or more secondary shared secret keys that CMs can use to successfully process the DOCSIS configuration file and register with the CMTS.                              |
| <b>cable shared-secret</b>           | Configures an authentication shared secret key that CMs must use to successfully process the DOCSIS configuration file and register with the CMTS.                                  |
| <b>cable tftp-enforce</b>            | Requires that all CMs on a cable interface attempt to download a DOCSIS configuration file using TFTP through the cable interface before being allowed to register and come online. |
| <b>clear cable modem lock</b>        | Resets the lock on one or more CMs, and reinitializes them, so that they can reregister with a valid DOCSIS configuration file.                                                     |
| <b>show cable modem rogue</b>        | Displays a list of cable modems that have been marked, locked, or rejected because they failed the dynamic shared-secret authentication checks.                                     |

# cable dynamic-secret tftp insert-upgrade-server

To dynamically insert the IPv4 or IPv6 TLV values in the Data-over-Cable Service Interface Specifications (DOCSIS) configuration file to complete firmware upgrade on cable modems, use the **cable dynamic-secret tftp insert-upgrade-server** command in the global configuration mode.

**cable dynamic-secret tftp insert-upgrade-server**

**no cable dynamic-secret tftp insert-upgrade-server**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Disabled

**Command Modes** Global configuration (config)

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.2(33)SCD2 | This command was introduced. |

**Usage Guidelines** The Dynamic Shared Secret feature must be configured first before you can upgrade the firmware on cable modems. To enable this feature, execute the **cable dynamic-secret** command in the cable interface configuration mode.

**Examples** The following example dynamically inserts the correct IPv4 or IPv6 TLV values from the DOCSIS configuration file to upgrade firmware on the cable modems.

```
Router(config)# cable dynamic-secret tftp insert-upgrade-server
Router(config)# end
```

| Related Commands | Command                             | Description                                                                                                                                                                                      |
|------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dynamic-secret</b>         | Enables the Dynamic Shared Secret feature so that DOCSIS configuration files are verified with a Message Integrity Check (MIC) that has been created with a dynamically generated shared secret. |
|                  | <b>cable dynamic-secret exclude</b> | Excludes one or more specific cable modems from being processed by the Dynamic Shared Secret feature.                                                                                            |
|                  | <b>clear cable modem lock</b>       | Resets the lock on one or more CMs, and re-initializes them, so that they can reregister with a valid DOCSIS configuration file.                                                                 |

■ cable dynamic-secret tftp insert-upgrade-server



## Cable Commands: cable e through cable i

Revised: May 2013, OL-15510-16

### New Commands

| Command                                                      | Cisco IOS Software Release |
|--------------------------------------------------------------|----------------------------|
| <b>cable ip-init</b>                                         | 12.2(33)SCA                |
| <b>cable ipv6 source-verify</b>                              | 12.2(33)SCA                |
| <b>cable init-channel-timeout</b>                            | 12.2(33)SCC                |
| <b>cable ipc-stats</b>                                       | 12.2(33)SCC                |
| <b>cable ipv6 source-verify leasequery-filter downstream</b> | 12.2(33)SCF1               |

### Modified Commands

| Command                          | Cisco IOS Software Release |
|----------------------------------|----------------------------|
| <b>cable event syslog-server</b> | 12.2(33)SCA                |
| <b>cable fiber-node</b>          | 12.3(23)BC                 |
| <b>cable filter group</b>        | 12.2(33)SCA                |
| <b>cable helper-address</b>      | 12.2(33)SCB                |
| <b>cable helper-address</b>      | 12.2(33)SCC                |
| <b>cable freq-range</b>          | 12.2(33)SCE                |
| <b>cable ipv6 source-verify</b>  | 12.2(33)SCF1               |

# cable enable-trap

To permanently set four CISCO-DOCS-EXT-MIB MIB attributes that enable the sending of a trap when a CM changes between the online and offline states, use the **cable enable-trap** command in cable interface configuration mode. To return to the default settings found in the MIB, which disable the sending of these traps, use the **no** form of this command.

**cable enable-trap** [**cmonoff-notification** | **cmonoff-interval** *time-in-secs*]

**no cable enable-trap** [**cmonoff-notification** | **cmonoff-interval**]

## Syntax Description

|                             |                                                                                              |
|-----------------------------|----------------------------------------------------------------------------------------------|
| <b>cmonoff-notification</b> | Enables or disables the sending of the notification traps.                                   |
| <b>cmonoff-interval</b>     | Specifies the minimum interval that must pass before sending out a new trap for the same CM. |
| <i>time-in-secs</i>         | Specifies the number of seconds (0 to 86400 seconds). The default value is 600 seconds.      |

## Command Default

The default is to use the MIB defaults, which specify that traps are not to be sent, with an interval value of 600 seconds (10 minutes).

## Command Modes

Interface configuration (cable interface only) (config-if)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.0(13)SC  | This command was introduced.                                                                                       |
| 12.1(5)EC1  | This command was added to the 12.1 EC train and support was added for the Cisco uBR7100 series routers.            |
| 12.2(4)BC1  | This command was added to the 12.2 BC train and support was added for the Cisco uBR10012 router.                   |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

This command sets four attributes in the CISCO-DOCS-EXT-MIB MIB, so that the new values can be automatically loaded whenever the CMTS router powers on or reloads. To do so, put the appropriate commands in the configuration file and save it to the CMTS router's Flash memory. The CMTS router automatically sets the appropriate MIB values when it processes the configuration file at startup.

These commands affect whether the CM online/offline notification trap (cdxCmtsCmOnOffNotification) is sent, and if so, the minimum interval that must exist between traps that are sent for the same CM undergoing the same state changes. The following describes the relationship between these commands and the attributes in the CISCO-DOCS-EXT-MIB MIB:

- The **cable enable-trap cmonoff-notification** command sets the cdxCmtsCmOnOffTrapEnable attribute to 1 (true), which enables the sending of the CM online and offline traps.

- The **no cable enable-trap cmonoff-notification** command sets the `cdxCmtsCmOnOffTrapEnable` attribute to 2 (false), which disables the sending of the CM online and offline traps.
- The **cable enable-trap cmonoff-interval** command sets the `cdxCmtsCmOnOffTrapInterval` attribute to the specified time period (0 to 86400 seconds), which sets the minimum interval that must exist before the CMTS sends out the same trap for the same CM. For example, if the interval is set to the default of 600 seconds, and the same CM goes offline three times and online twice in that time period, only one online trap and one offline trap is sent to the SNMP manager.
- The **no cable enable-trap cmonoff-interval** command sets the `cdxCmtsCmOnOffTrapInterval` attribute to 0, which means a trap will be sent for every CM online/offline transition.

**Note**

Setting the **cmonoff-interval** option and the `cdxCmtsCmOnOffTrapInterval` attribute has meaning only if `cdxCmtsCmOnOffNotification` traps have been previously enabled.

**Examples**

The following commands enable the sending of CM on or off traps, with a minimum interval of 1200 seconds between traps being sent for the same CM:

```
router(config)# interface c6/0
router(config-if)# cable enable-trap cmonoff-notification
router(config-if)# cable enable-trap cmonoff-interval 1200
router(config-if)# exit
router(config)#
```

The following commands disable the sending of CM on or off traps.

```
router(config)# interface c6/0
router(config-if)# no cable enable-trap cmonoff-notification
router(config-if)# exit
router(config)#
```

**Related Commands**

| Command                                     | Description                                        |
|---------------------------------------------|----------------------------------------------------|
| <b>snmp-server enable traps cable</b>       | Enables traps for cable-related events.            |
| <b>snmp-server enable traps docsis-cmts</b> | Enables traps for DOCSIS-related MAC-layer events. |

## cable event priority

To configure the event reporting flags for DOCSIS event messages, which determines how the Cisco CMTS reports these events, use the **cable event priority** command in global configuration mode. To return to the default settings found in the MIB, use the **no** form of this command.

**cable event priority** {**alert** | **critical** | **debug** | **emergency** | **error** | **informational** | **notice** | **warning**} *flags*

| Syntax Description   |  |                                                                                                                                                                                                                                                                                                           |
|----------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>alert</b>         |  | Sets the event reporting flag for alert system error messages. (Alert messages indicate that some type of system or connection failure has occurred and requires immediate attention.)                                                                                                                    |
| <b>critical</b>      |  | Sets the event reporting flag for critical system error messages. (Critical messages indicate that an error occurred which requires immediate attention to avoid system or connection failure.)                                                                                                           |
| <b>debug</b>         |  | Sets the event reporting flag for debug system error messages. (Debug messages appear only when debugging has been enabled.)                                                                                                                                                                              |
| <b>emergency</b>     |  | Sets the event reporting flag for emergency system error messages. (Emergency messages indicate that the system has become unusable and requires immediate attention. This problem might also be affecting other parts of the network.)                                                                   |
| <b>error</b>         |  | Sets the event reporting flag for error system error messages. (Error messages indicate that an error condition occurred that requires attention to resolve. Failure to address this problem will result in some type of system or connection failure in the near future.)                                |
| <b>informational</b> |  | Sets the event reporting flag for informational system error messages. (Informational messages might or might not be significant to the system administrators.)                                                                                                                                           |
| <b>notice</b>        |  | Sets the event reporting flag for notice system error messages. (Notice messages indicate that a situation occurred that is normal but is significant enough that system administrators might want to notice.)                                                                                            |
| <b>warning</b>       |  | Sets the event reporting flag for warning system error messages. (Warning messages indicate that a condition occurred that indicates attention is needed in near future to avoid potential problems. Failure to address this problem could result in some type of system or connection failure later on.) |
| <i>flags</i>         |  | Sets the event reporting flags value, in hex, which specifies how this particular type of event message should be reported. The valid range is 0x0 through 0xF0, which is a bitmask specifying the types of reporting that should be done. See the Usage Guidelines for details.                          |

### Command Default

The defaults are configured as per the [DOCSIS 1.1 Operations Support System Interface \(OSSI\) Specification](#):

- Emergency and alert messages = (0x10) (reported to the local volatile log)
- Critical, error, warning, and notice = (0x70) (reported to the local volatile log, and forwarded as traps and to the SYSLOG server)
- Information and debug = 0x0 (not reported)



**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(8)BC1  | This command was introduced.                                                                                       |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** The DOCSIS 1.1 specifications require the CMTS to generate a set of messages for DOCSIS-specific events. These messages can be assigned one of eight priority levels, ranging from emergency (the highest level) to debug (the lowest level), and the CMTS can be configured to log each level of messages differently.

The Cisco CMTS supports the following types of logging, as defined by the [DOCS-CABLE-DEVICE-MIB \(RFC 2669\)](#):

- none (0x0) = DOCSIS messages are not reported. (The corresponding Cisco IOS event messages, however, continue to be logged.)
- local-volatile (0x10) = DOCSIS messages are saved in a local log on the CMTS. This log can be limited in size and can automatically discard previous messages to make room for incoming messages.
- syslog (0x20) = DOCSIS messages are sent to a SYSLOG server (if one has been configured, using the **cable event syslog-server** command).
- traps (0x40) = DOCSIS messages are sent as SNMP traps to one or more SNMP managers.

These values can be added together to specify that the CMTS should report an event in more than one way. For example, a value of 0x70 specifies that the CMTS should record the event in its local volatile log, and also send it both as a trap and as a SYSLOG message.



**Note**

If event messages are configured for traps or syslog reporting, they must also be configured for either local volatile or local non-volatile reporting. This means that values 0x20 (syslog-only), 0x40 (trap-only), and 0x60 (syslog and trap only) are not supported.

Use the **cable event priority** command to set the reporting flags for each type of event. This also configures the appropriate instance of the docsDevEvReporting attribute [DOCS-CABLE-DEVICE-MIB \(RFC 2669\)](#) with the same value.



**Note**

This command affects only the DOCSIS event messages, and does not affect how the Cisco IOS software handles event messages. If SYSLOG traps are enabled on the Cisco CMTS (using the **snmp-server enable traps syslog** command), they continue to be sent, regardless of the **cable event priority** configuration.

**Examples** The following commands configure the Cisco CMTS so that it reports all emergency, alert, and critical messages as SNMP traps and SYSLOG messages, as well as logging it in the local volatile log:

```
Router# configure terminal
```

```
Router(config)# cable event priority alert 0x70
Router(config)# cable event priority critical 0x70
Router(config)# cable event priority emergency 0x70
```

The following commands configure the Cisco CMTS so that it reports the lowest priority messages only to the local volatile log and SYSLOG server:

```
Router# configure terminal
Router(config)# cable event priority debug 0x30
Router(config)# cable event priority informational 0x30
Router(config)# cable event priority notice 0x30
```

## Related Commands

| Command                                     | Description                                                                                                                                        |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable event syslog-server</b>            | Enables logging of DOCSIS event messages to a SYSLOG server.                                                                                       |
| <b>cable event throttle-adminStatus</b>     | Configures how the Cisco CMTS throttles the SNMP traps and SYSLOG messages it generates for DOCSIS event messages.                                 |
| <b>cable event throttle-interval</b>        | Specifies the throttle interval, which helps control how often the Cisco CMTS generates SNMP traps and SYSLOG messages for DOCSIS event messages.  |
| <b>cable event throttle-threshold</b>       | Sets the maximum number of SNMP traps and SYSLOG messages that the Cisco CMTS can generate for DOCSIS event messages during the throttle interval. |
| <b>snmp-server enable traps cable</b>       | Enables traps for cable-related events.                                                                                                            |
| <b>snmp-server enable traps docsis-cmts</b> | Enables traps for DOCSIS-related MAC-layer events.                                                                                                 |

# cable event syslog-server

To enabling logging of DOCSIS event messages to a SYSLOG server, use the **cable event syslog-server** command in global configuration mode. To disable the logging of a DOCSIS syslog server, use the **no** form of this command.

**cable event syslog-server** *ip-address*

**no cable event syslog-server**

## Syntax Description

*ip-address* Specifies the IPv4 or IPv6 address for the DOCSIS SYSLOG server, which is the docsDevEvSyslog attribute in the DOCS-CABLE-DEVICE-MIB (RFC 2669). If the IP address is 0.0.0.0 or 0:0:0:0::0, SYSLOG service is disabled for DOCSIS events.

## Command Default

0.0.0.0 or 0:0:0:0::0 (No DOCSIS SYSLOG server is defined.)

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                                             |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(8)BC1  | This command was introduced.                                                                                                             |
| 12.2(33)SCA | This command was modified in Cisco IOS Release 12.2(33)SCA to support IPv6 addresses. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The DOCSIS 1.1 specifications require the CMTS router to generate a set of messages for DOCSIS-specific events. Use the **cable event syslog-server** command to enable DOCSIS SYSLOG services and to set the IP address for the DOCSIS SYSLOG server (which is the docsDevEvSyslog attribute in the DOCS-CABLE-DEVICE-MIB).

You can also configure the server's IP address by using SNMP commands to set the docsDevEvSyslog attribute directly. Setting the docsDevEvSyslog attribute also creates a matching **cable event syslog-server** command in the router's configuration.

When you specify the IP address for a DOCSIS SYSLOG server, either by using the **cable event syslog-server** command or by setting the docsDevEvSyslog attribute, the Cisco CMTS router begins generating event messages that conform to the DOCSIS 1.1 specifications. This format is similar to but not identical to the format that is used by the Cisco IOS software. For example, the following message is in the typical Cisco IOS software format:

```
%UBR7200-4-DCC_ACK_REJ_MSG_SYNTAX_ERROR: DCC-ACK rejected message syntax error
```

The same error message appears as follows when using the DOCSIS 1.1 format:

```
<133>CMTS[DOCSIS]:<67040500> DCC-ACK rejected message syntax error
```

To disable the sending of events to the DOCSIS SYSLOG server, you can use the **no cable event syslog-server** command, or you can specify an IP address of 0.0.0.0 (**cable event syslog-server 0.0.0.0**). Both commands set the docsDevEvSyslog attribute to 0.0.0.0 and disable DOCSIS SYSLOG service. This does not, however, disable the Cisco IOS SYSLOG server (if one has been configured using the **logging ip-address** command).

**Note**

You can use the same SYSLOG server for both Cisco IOS event messages and for DOCSIS-style event messages, but it might be more convenient to use separate servers for the two different message formats. Use the **logging ip-address** command in global configuration mode to set the IP address for the Cisco IOS SYSLOG server. The DOCSIS SYSLOG server collects only event messages for DOCSIS events, using the DOCSIS format, while the Cisco IOS server collects all event messages (including DOCSIS events), but using the standard Cisco IOS message format.

**Tip**

For more information about DOCSIS SYSLOG services and event messages, see Section 4.4.2.2.2, SYSLOG Message Format, in the DOCSIS 1.1 Operations Support System Interface (OSSI) Specification (SP-OSSIV1.1-I06-020830). For more information about all cable-related event messages that can be generated on a Cisco CMTS router, see the Cisco CMTS System Messages guide.

**Examples**

The following command sets the docsDevEvSyslog attribute with an IPv4 address of 192.168.100.137:

```
cable event syslog-server 192.168.100.137
```

The following commands specifies different SYSLOG servers. The server at IPv4 address 192.168.100.137 receives the DOCSIS-style event messages, and the server at IPv4 address 192.168.100.138 receives the Cisco IOS style messages.

```
cable event syslog-server 192.168.100.137
logging 192.168.100.138
```

The following command sets the docsDevEvSyslog attribute to IPv4 address 0.0.0.0, which disables DOCSIS SYSLOG services:

```
no cable event syslog-server
```

**Note**

You can also disable DOCSIS SYSLOG services with the **cable event syslog-server 0.0.0.0** command.

The following command specifies a DOCSIS SYSLOG server with an IPv6 address:

```
cable event syslog-server 2001:0DB8:0:ABCD::1
```

**Related Commands**

| Command                                 | Description                                                                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>cable event priority</b>             | Configures the event reporting flags for DOCSIS event messages, which determines how the Cisco CMTS router reports these events. |
| <b>cable event throttle-adminStatus</b> | Configures how the Cisco CMTS router throttles the SNMP traps and SYSLOG messages it generates for DOCSIS event messages.        |

| Command                                     | Description                                                                                                                                               |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable event throttle-interval</b>        | Specifies the throttle interval, which helps control how often the Cisco CMTS router generates SNMP traps and SYSLOG messages for DOCSIS event messages.  |
| <b>cable event throttle-threshold</b>       | Sets the maximum number of SNMP traps and SYSLOG messages that the Cisco CMTS router can generate for DOCSIS event messages during the throttle interval. |
| <b>snmp-server enable traps cable</b>       | Enables traps for cable-related events.                                                                                                                   |
| <b>snmp-server enable traps docsis-cmts</b> | Enables traps for DOCSIS-related MAC-layer events.                                                                                                        |

# cable event throttle-adminStatus

To configure how the Cisco CMTS router throttles the SNMP traps and syslog messages it generates for DOCSIS event messages, use the **cable event throttle-adminStatus** command in global configuration mode. To restore the default behavior, use the **no** form of this command.

```
cable event throttle-adminStatus {inhibited | maintainBelowThreshold | stopAtThreshold | unconstrained}
```

```
no cable event throttle-adminStatus
```

|                    |                               |                                                                                                                                                                                                                                                                  |
|--------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>inhibited</b>              | All SNMP traps and syslog messages for DOCSIS event messages are suppressed.                                                                                                                                                                                     |
|                    | <b>maintainBelowThreshold</b> | Throttling is performed, so that SNMP traps and syslog messages are suppressed if they would otherwise exceed the throttle threshold. The Cisco CMTS resumes generating traps and messages at the start of the next throttle interval.                           |
|                    | <b>stopAtThreshold</b>        | Throttling is performed, so that the Cisco CMTS stops generating all SNMP traps and syslog messages if they would exceed the throttle threshold. The Cisco CMTS does not resume generating traps and messages until directed to do so by repeating this command. |
|                    | <b>unconstrained</b>          | SNMP traps and syslog messages for DOCSIS event messages are not throttled.                                                                                                                                                                                      |

|                 |                                                                    |
|-----------------|--------------------------------------------------------------------|
| Command Default | <b>unconstrained</b> (no throttling of traps and messages is done) |
|-----------------|--------------------------------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(8)BC1  | This command was introduced.                                                                                       |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

This command sets the value of the docsDevEvThrottleAdminStatus attribute in the [DOCS-CABLE-DEVICE-MIB](#) MIB (RFC 2669), which controls whether the Cisco CMTS should throttle SNMP traps and syslog messages that are generated for DOCSIS event messages.

The [DOCS-CABLE-DEVICE-MIB](#) MIB supports the following threshold configurations:

- inhibited—The Cisco CMTS does not generate any SNMP traps or syslog messages for DOCSIS events.

- **maintainBelowThreshold**—Throttling is performed, and SNMP traps and syslog messages are suppressed if they would exceed the throttle threshold (as set by the **cable event throttle-interval** and **cable event throttle-threshold** commands). The Cisco CMTS resumes generating traps and messages at the start of the next throttle interval.
- **stopAtThreshold**—Throttling is performed, and the Cisco CMTS stops generating all SNMP traps and syslog messages when they exceed the throttle threshold. The Cisco CMTS does not resume generating traps and messages until the threshold state is reset. This can be done by repeating the **cable event throttle-adminStatus** command, or by setting the docsDevEvThrottleAdminStatus attribute in the [DOCS-CABLE-DEVICE-MIB](#) MIB.
- **unconstrained**—All SNMP traps and syslog messages are transmitted without any throttling.

**Tip**

For more information about DOCSIS syslog services and event messages, see Section 4.4.2.2.2, syslog Message Format, in the [DOCSIS 1.1 Operations Support System Interface \(OSSI\) Specification](#) (SP-OSSIV1.1-I06-020830). For more information about all cable-related event messages that can be generated on the Cisco CMTS router, see the Cisco CMTS Error Message manual.

**Examples**

The following commands configure the Cisco CMTS router to throttle SNMP traps and syslog messages according to the specified throttle interval and threshold:

```
Router# configure terminal
Router(config)# cable event throttle-interval 90
Router(config)# cable event throttle-threshold 30
Router(config)# cable event throttle adminStatus maintainBelowThreshold
```

The following commands configure the Cisco CMTS router for the default behavior, so that it does not throttle SNMP traps and syslog messages. The configured throttle interval and threshold are ignored.

```
Router# configure terminal
Router(config)# cable event throttle adminStatus unconstrained
```

**Related Commands**

| Command                                     | Description                                                                                                                                        |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable event priority</b>                 | Configures the event reporting flags for DOCSIS event messages, which determines how the Cisco CMTS reports these events.                          |
| <b>cable event syslog-server</b>            | Enables logging of DOCSIS event messages to a syslog server.                                                                                       |
| <b>cable event throttle-interval</b>        | Specifies the throttle interval, which helps control how often the Cisco CMTS generates SNMP traps and syslog messages for DOCSIS event messages.  |
| <b>cable event throttle-threshold</b>       | Sets the maximum number of SNMP traps and syslog messages that the Cisco CMTS can generate for DOCSIS event messages during the throttle interval. |
| <b>snmp-server enable traps cable</b>       | Enables traps for cable-related events.                                                                                                            |
| <b>snmp-server enable traps docsis-cmts</b> | Enables traps for DOCSIS-related MAC-layer events.                                                                                                 |

# cable event throttle-interval

To specify the throttle interval, which controls how often the Cisco CMTS router generates SNMP traps and syslog messages for DOCSIS event messages, use the **cable event throttle-interval** command in global configuration mode. To restore the default behavior, use the **no** form of this command.

**cable event throttle-interval** *seconds*

**no cable event throttle-interval**

## Syntax Description

*seconds* Length of the throttle interval, in seconds. The valid range is 0 to 2147483647 seconds, with a default of 60 seconds.

## Command Default

60 seconds (1 minute)

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(8)BC1  | This command was introduced.                                                                                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The DOCSIS 1.1 specifications require the CMTS to generate a set of messages for DOCSIS-specific events. In certain situations, such as a power outage that causes a mass reregistration of cable modems, this can generate such a large volume of event messages that it can impact system performance.

To avoid this possibility, use the **cable event throttle-interval** command, together with the **cable event throttle-threshold** command, to specify the maximum number of SNMP traps or syslog events that the Cisco CMTS can generate for DOCSIS events over a specific interval:

- **cable event throttle-interval**—Specifies the length of the throttle interval.
- **cable event throttle-threshold**—Specifies the maximum number of SNMP traps and syslog events that the Cisco CMTS can generate during that period.

The threshold value counts DOCSIS events, not SNMP traps or syslog messages. If a DOCSIS event generates both an SNMP trap and a syslog message, the Cisco CMTS counts it as only one event.



### Note

The **cable event throttle-interval** and **cable event throttle-threshold** commands do not have any effect unless the **cable event throttle-adminStatus** has been configured to allow the throttling of DOCSIS event messages.



**Tip**

For more information about DOCSIS syslog services and event messages, see Section 4.4.2.2.2, syslog Message Format, in the [DOCSIS 1.1 Operations Support System Interface \(OSSI\) Specification](#) (SP-OSSIV1.1-I06-020830). For more information about all cable-related event messages that can be generated on the Cisco CMTS router, see the Cisco CMTS Error Message manual.

**Examples**

The following commands configure the Cisco CMTS router so that it can generate a maximum number of 30 SNMP traps and syslog messages for DOCSIS events over a 90-second period:

```
Router# configure terminal
Router(config)# cable event throttle-interval 90
Router(config)# cable event throttle-threshold 30
```

**Related Commands**

| Command                                     | Description                                                                                                                                        |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable event priority</b>                 | Configures the event reporting flags for DOCSIS event messages, which determines how the Cisco CMTS reports these events.                          |
| <b>cable event syslog-server</b>            | Enables logging of DOCSIS event messages to a syslog server.                                                                                       |
| <b>cable event throttle-adminStatus</b>     | Configures how the Cisco CMTS throttles the SNMP traps and syslog messages it generates for DOCSIS event messages.                                 |
| <b>cable event throttle-threshold</b>       | Sets the maximum number of SNMP traps and syslog messages that the Cisco CMTS can generate for DOCSIS event messages during the throttle interval. |
| <b>snmp-server enable traps cable</b>       | Enables traps for cable-related events.                                                                                                            |
| <b>snmp-server enable traps docsis-cmts</b> | Enables traps for DOCSIS-related MAC-layer events.                                                                                                 |

# cable event throttle-threshold

To set the maximum number of SNMP traps and syslog messages that the Cisco CMTS router can generate for DOCSIS event messages during the throttle interval, use the **cable event throttle-threshold** command in global configuration mode. To restore the default number, use the **no** form of this command.

**cable event throttle-threshold** *number*

**no cable event throttle-threshold**

## Syntax Description

*number* Maximum allowable number of DOCSIS events for which the Cisco CMTS can generate SNMP traps and syslog messages during the throttle period. The valid range is 0 to 2147483647, with a default of 10.

## Command Default

The default maximum is 10.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(8)BC1  | This command was introduced.                                                                                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The DOCSIS 1.1 specifications require the CMTS to generate a set of messages for DOCSIS-specific events. In certain situations, such as a power outage that causes a mass reregistration of cable modems, this can generate such a large volume of event messages that it can impact system performance.

To avoid this possibility, use the **cable event throttle-threshold** command, together with the **cable event throttle-interval** command, to specify the maximum number of SNMP traps or syslog events that the Cisco CMTS can generate for DOCSIS events over a specific interval:

- **cable event throttle-interval**—Specifies the length of the throttle interval.
- **cable event throttle-threshold**—Specifies the maximum number of SNMP traps and syslog events that the Cisco CMTS can generate during that period.

The threshold value counts DOCSIS events, not SNMP traps or syslog messages. If a DOCSIS event generates both an SNMP trap and a syslog message, the Cisco CMTS counts it as only one event.



### Note

The **cable event throttle-interval** and **cable event throttle-threshold** commands do not have any effect unless the **cable event throttle-adminStatus** has been configured to allow the throttling of DOCSIS event messages.

**Tip**

For more information about DOCSIS syslog services and event messages, see Section 4.4.2.2.2, syslog Message Format, in the [DOCSIS 1.1 Operations Support System Interface \(OSSI\) Specification](#) (SP-OSSIV1.1-I06-020830). For more information about all cable-related event messages that can be generated on the Cisco CMTS router, see the Cisco CMTS Error Message manual.

**Examples**

The following commands configure the Cisco CMTS router so that it can generate a maximum number of 25 SNMP traps and syslog messages for DOCSIS events over a two-minute period:

```
Router# configure terminal
Router(config)# cable event throttle-interval 120
Router(config)# cable event throttle-threshold 25
```

**Related Commands**

| Command                                     | Description                                                                                                                                       |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable event priority</b>                 | Configures the event reporting flags for DOCSIS event messages, which determines how the Cisco CMTS reports these events.                         |
| <b>cable event syslog-server</b>            | Enables logging of DOCSIS event messages to a syslog server.                                                                                      |
| <b>cable event throttle-adminStatus</b>     | Configures how the Cisco CMTS throttles the SNMP traps and syslog messages it generates for DOCSIS event messages.                                |
| <b>cable event throttle-interval</b>        | Specifies the throttle interval, which helps control how often the Cisco CMTS generates SNMP traps and syslog messages for DOCSIS event messages. |
| <b>snmp-server enable traps cable</b>       | Enables traps for cable-related events.                                                                                                           |
| <b>snmp-server enable traps docsis-cmts</b> | Enables traps for DOCSIS-related MAC-layer events.                                                                                                |

# cable fiber-node

To enter cable fiber-node configuration mode to configure a fiber node, use the **cable fiber-node** command in global configuration mode. To remove a fiber node configuration, use the **no** form of this command.

**cable fiber-node** *fiber-node-id*

**no cable fiber-node** *fiber-node-id*

|                           |                      |                                                                                |
|---------------------------|----------------------|--------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>fiber-node-id</i> | Specifies a unique numerical ID for the fiber node. Valid values are 1 to 256. |
|---------------------------|----------------------|--------------------------------------------------------------------------------|

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | The command mode is unchanged. |
|------------------------|--------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                     |
|------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.3(21)BC     | This command was introduced for the Cisco uBR10012 router.                                                                                              |
|                        | 12.3(23)BC     | This command was updated to allow an RF channel from the SPA or a Cisco uBR10-MC5X20 downstream channel can serve as a primary channel in a fiber node. |

**Usage Guidelines**

The **cable fiber-node** command allows the multiple service operator (MSO) or service provider to configure the CMTS to be more intelligent by making Cisco IOS aware of how the cable plant is wired. The downstream channels of the cable plant must be accurately configured in the CMTS fiber nodes. This allows the CMTS to accurately signal the wideband modems on which wideband channels are available to the modem.

In a cable network, a cable modem is physically connected to only one fiber node. Fiber node software configuration mirrors the physical topology of the cable network. When configuring fiber nodes with Cisco IOS CLI commands, a fiber node is a software mechanism to define the following:

- The set of downstream RF channels that will flow into the fiber node
- At least one primary downstream channel



**Note** In Cisco IOS Releases 12.3(21)BC and 12.3(21a)BC3, this is a traditional DOCSIS downstream channel for the fiber node. Beginning in Cisco IOS Release 12.3(23)BC, either an RF channel from the SPA or a Cisco uBR10-MC5X20 downstream channel can serve as a primary channel in a fiber node.

- The set of upstream channel ports on the cable interface line card that are connected to the fiber node and available as upstream channels

Use the **cable fiber-node** command to enter cable fiber-node configuration mode so that you can configure a fiber node.

For a wideband channel to work correctly, each fiber node must be configured as follows:

1. Use the **cable fiber-node** command to create the fiber node and to enter cable fiber-node configuration mode.
2. Use the **downstream** command to associate the fiber node with one or more primary downstream channels (traditional DOCSIS downstream channels).



**Note** Beginning in Cisco IOS Release 12.3(23)BC, if the primary downstream channel for this fiber node is assigned from a SPA RF downstream channel, then this command is not required.

3. Use the **upstream** command to specify the upstream channel ports for a fiber node.
4. Use the **downstream modular-cable rf-channel** command to make one or more SPA RF channels available for the fiber node.
5. Optionally, use the **description (cable fiber-node)** command to specify a description for the fiber node.

For each fiber node, a traditional DOCSIS downstream channel on the Cisco uBR10-MC5X20 cable interface line card is used to carry MAC management and signaling messages, and the associated traditional DOCSIS upstream channel is used for return data traffic and signaling. The traditional DOCSIS downstream channel used in this way is called the *primary downstream channel*. Beginning in Cisco IOS Release 12.3(23)BC, either an RF channel from the SPA or a Cisco uBR10-MC5X20 downstream channel can serve as a primary channel in a fiber node. If the fiber node does not have a Cisco uBR10-MC5X20 downstream channel, then make sure that at least one of the SPA RF channels specified in the **downstream modular-cable rf-channel** command is a primary-capable downstream channel.

Each wideband channel must be associated with at least one primary downstream channel and can be associated with multiple primary downstream channels. A wideband channel and its associated primary downstream channels must belong to the same virtual bundle interface.

The maximum number of cable fiber nodes that can be configured is limited to 256 for each CMTS.

## Examples

The following example shows how to enter configuration mode for fiber node 5.

### Cisco IOS Release 12.3(21)BC

```
Router# configure terminal
Router(config)# cable fiber-node 5
Router(config-fiber-node)#
downstream Cable 6/0/0
downstream Modular-Cable 1/0/0 rf-channel 0-1
upstream cable 5/0 connector 0
```

### Cisco IOS Release 12.3(23)BC

```
Router# configure terminal
Router# cable fiber-node 5
Router(config-fiber-node)#
downstream Modular-Cable 1/0/0 rf-channel 0-3
upstream cable 5/0 connector 0
```

| Related Commands | Command                                        | Description                                                                         |
|------------------|------------------------------------------------|-------------------------------------------------------------------------------------|
|                  | <b>description (cable fiber-node)</b>          | Specifies a description for a fiber node.                                           |
|                  | downstream cable                               | Assigns a primary downstream channel for a fiber node.                              |
|                  | <b>downstream modular-cable<br/>rf-channel</b> | Specifies the RF channels that are available for wideband channels on a fiber node. |
|                  | upstream cable connector                       | Specifies the upstream channel ports for a fiber node.                              |

# cable filter group

To create, configure, and activate a DOCSIS 1.1 filter group that filters packets on the basis of the TCP/IP and UDP/IP headers, use the **cable filter group** command in global configuration mode. To delete a filter group or to reset a particular option to its default value, use the **no** form of this command.

**cable filter group** *group-id index index-num [option option-value]*

**no cable filter group** *group-id index index-num [option option-value]*

## Syntax Description

|                                                                |                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group-id</i>                                                | Specifies a unique group ID for this filter group. The valid range is 1 to 254. 255 is reserved for use by the CMTS router.                                                                                                                                                                                                                              |
| <i>index-num</i>                                               | Specifies a unique index for this particular filter. The valid range is 1 to 128 on a uBR7200 series router and 1 to 255 on a uBR10012 router.                                                                                                                                                                                                           |
| <b>Specify one of the following options and option-values:</b> |                                                                                                                                                                                                                                                                                                                                                          |
| <b>dest-ip</b> <i>ip-address</i>                               | (Optional) Specifies the destination IP address that should be matched. The default IP address is 0.0.0.0. (IPv4 filters only)                                                                                                                                                                                                                           |
| <b>dest-mac-addr</b> <i>mac-address</i>                        | (Optional) Specifies the destination MAC address that should be matched.                                                                                                                                                                                                                                                                                 |
| <b>dest-mac-mask</b> <i>mask</i>                               | (Optional) Specifies the mask for the destination MAC address that should be matched.                                                                                                                                                                                                                                                                    |
| <b>dest-mask</b> <i>mask</i>                                   | (Optional) Specifies the mask for the destination address that should be matched. The <i>mask</i> is ANDed with the IP address specified by the <b>dest-ip</b> option and compared to the result of ANDing the <i>mask</i> with the packet's destination IP address. The filter considers it a match if the two values are the same. (IPv4 filters only) |
|                                                                | <b>Note</b> The default mask of 0.0.0.0 matches all IP addresses.                                                                                                                                                                                                                                                                                        |
| <b>dest-port</b> <i>port-number</i>                            | (Optional) Specifies the TCP/UDP destination port number that should be matched. The valid range is 0 to 65535. The default value matches all TCP/UDP port numbers. (IPv4 and IPv6 filters)                                                                                                                                                              |
| <b>eth-proto-type</b> <i>ethernet protocol type</i>            | (Optional) Specifies the Ethernet protocol type number that should be matched. The valid range is 0 to 65536.                                                                                                                                                                                                                                            |
| <b>eth-protocol</b> <i>ethernet protocol number</i>            | (Optional) Specifies the Ethernet protocol that should be matched. The valid range is 0 to 65536.                                                                                                                                                                                                                                                        |
| <b>ip-proto</b> <i>proto-type</i>                              | (Optional) Specifies the IP protocol type number that should be matched. The valid range is 0 to 256, with a default value of 256 that matches all protocols. (IPv4 and IPv6 filters)                                                                                                                                                                    |
|                                                                | Some commonly-used values are:                                                                                                                                                                                                                                                                                                                           |
|                                                                | <ul style="list-style-type: none"> <li>1—ICMP, Internet Control Message Protocol.</li> <li>2—IGMP, Internet Group Management Protocol.</li> <li>4—IP in IP encapsulation.</li> <li>6—TCP, Transmission Control Protocol.</li> <li>17—UDP, User Datagram Protocol.</li> </ul>                                                                             |

|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ip-tos</b> <i>tos-mask tos-value</i>                               | <p>(Optional) Specifies a type of service (TOS) mask and value to be matched (IPv4 and IPv6 filters):</p> <ul style="list-style-type: none"> <li>• <i>tos-mask</i>—8-bit value expressed in hexadecimal notation. The valid range is 0x00 through 0xFF.</li> <li>• <i>tos-value</i>—8-bit value expressed in hexadecimal notation. The valid range is 0x00 through 0xFF.</li> </ul> <p>The <i>tos-mask</i> is logically ANDed with the <i>tos-value</i> and compared to the result of ANDing the <i>tos-mask</i> with the packet's actual TOS value. The filter considers it a match if the two values are the same.</p> <p><b>Note</b> The default values for both parameters matches all ToS values.</p> |
| <b>ip-version</b>                                                     | <p>(Optional) Specifies the IP version of the filter:</p> <ul style="list-style-type: none"> <li>• <b>ipv4</b>—Filter is an IP version 4 filter group (default).</li> <li>• <b>ipv6</b>—Filter is an IP version 6 filter group.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>match-action</b> { <b>accept</b>   <b>drop</b> }                   | <p>(Optional) Specifies the action that should be taken for packets that match this filter (IPv4 and IPv6 filters):</p> <ul style="list-style-type: none"> <li>• <b>accept</b>—Packets that match the filter are accepted (default).</li> <li>• <b>drop</b>—Packets that match the filter are dropped.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>range-dest-port</b> <i>start-port number end-port number</i>       | <p>(Optional) Specifies the TCP/UDP destination port start range. The valid range is 0 to 65535.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>range-ip-tos</b> <i>mask against TOS start value and end value</i> | <p>(Optional) Specifies IP TOS byte range settings expressed in hexadecimal notation. The valid range is 0x00 through 0xFF.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>range-src-port</b> <i>start-port number end-port number</i>        | <p>(Optional) Specifies TCP/UDP source port start range. The valid range is 0 to 65535.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>range-user-pri</b> <i>low-priority value high-priority value</i>   | <p>(Optional) Specifies the user priority. The valid range for priority is 0 to 8. The Priority field indicates the frame priority level from 0 (lowest) to 8 (highest), which prioritizes different classes of traffic (such as voice, video and data).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>src-ip</b> <i>ip-address</i>                                       | <p>(Optional) Specifies the source IP address that should be matched. The default IP address is 0.0.0.0. (IPv4 filters only)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>src-mac-addr</b> <i>mac address</i>                                | <p>(Optional) Specifies the source MAC address to be matched.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>src-mask</b> <i>mask</i>                                           | <p>(Optional) Specifies the mask for the source address that should be matched. The <i>mask</i> is ANDed with the IP address specified by the <b>src-ip</b> option and compared to the result of ANDing the <i>mask</i> with the packet's source IP address. The filter considers it a match if the two values are the same. (IPv4 filters only)</p> <p><b>Note</b> The default mask of 0.0.0.0 matches all IP addresses.</p>                                                                                                                                                                                                                                                                              |
| <b>src-port</b> <i>port-number</i>                                    | <p>(Optional) Specifies the TCP/UDP source port number that should be matched. The valid range is 0 to 65535. The default value matches all TCP/UDP port numbers. (IPv4 and IPv6 filters)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>status</b> { <b>active</b>   <b>inactive</b> } | (Optional) Enables or disables the filter (IPv4 and IPv6 filters): <ul style="list-style-type: none"> <li>• <b>active</b>—Enables the filter immediately (default).</li> <li>• <b>inactive</b> —Disables the filter immediately.</li> </ul> <p><b>Note</b> You must create a filter group using at least one of the other options before you can use this command to enable or disable the filter.</p> |
| <b>tcp-flags</b> <i>flags-mask flags-value</i>    | (Optional) Specifies the TCP flag mask and value to be matched (IPv4 and IPv6 filters): <ul style="list-style-type: none"> <li>• <i>flags-mask</i>—8-bit value expressed in hexadecimal notation. The valid range is 0x0 through 0x3F.</li> <li>• <i>flags-value</i>—8-bit value expressed in hexadecimal notation. The valid range is 0x0 through 0x3F.</li> </ul>                                    |
| <b>v6-dest-address</b> <i>ipv6-address</i>        | (Optional) Specifies the IPv6 destination address that should be matched using the format X:X:X:X::X. (IPv6 filters only)                                                                                                                                                                                                                                                                              |
| <b>v6-dest-pfxlen</b> <i>prefix-length</i>        | (Optional) Specifies the length of the network portion of the IPv6 destination address. The valid range is 0 to 128. (IPv6 filters only)                                                                                                                                                                                                                                                               |
| <b>v6-flow-label</b> <i>flow-label value</i>      | (Optional) Specifies the IPv6 flow label to be used by the source to label packets of a flow. The range is 0 to 1048575. A flow label of zero is used to indicate packets not part of any flow.                                                                                                                                                                                                        |
| <b>v6-src-address</b> <i>ipv6-address</i>         | (Optional) Specifies the IPv6 source address that should be matched using the format X:X:X:X::X. (IPv6 filters only)                                                                                                                                                                                                                                                                                   |
| <b>v6-src-pfxlen</b> <i>prefix-length</i>         | (Optional) Specifies the length of the network portion of the IPv6 source address. The valid range is 0 to 128. (IPv6 filters only)                                                                                                                                                                                                                                                                    |
| <b>vlan-id</b> <i>vlan-id</i>                     | (Optional) Specifies the VLAN Identifier to be matched, which is a 12-bit field specifying the VLAN to which the packet belongs. The valid range is 0 to 4094.                                                                                                                                                                                                                                         |

**Command Default**

No filter groups are defined. When a filter group is created, it defaults to accepting all source and destination IP addresses and TCP/UDP ports, all protocol types, and all ToS and TCP flag values.

**Command Modes**

Global configuration (config)

**Command History**

| Release               | Modification                                                                                                                                                                                                                               |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(6)EC1            | This command was introduced on the Cisco uBR7100 series and Cisco uBR7200 series routers.                                                                                                                                                  |
| 12.2(2)XF, 12.2(4)BC1 | This command was supported on the Cisco uBR10012 routers.                                                                                                                                                                                  |
| 12.2(8)BC2            | The <b>status</b> option was added to allow filter groups to be activated and deactivated without removing the filter group's configuration.                                                                                               |
| 12.2(33)SCA           | The <b>v6-src-address</b> , <b>v6-dest-address</b> , <b>v6-src-pfxlen</b> , <b>v6-dest-pfxlen</b> , and <b>ip-version</b> keyword options were added for support of IPv6 filter groups. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

This command implements DOCSIS 1.1 packet filtering, as defined in the [DOCS-SUBMGT-MIB](#). Each filter group can contain multiple filters, as defined by the different index numbers.

**Note**

The [DOCS-SUBMGT-MIB](#) MIB is supported only on Cisco IOS Release 12.2(8)BC2 and later 12.2 BC releases. See the description of the docsSubMgtPktFilterTable table in this MIB for further information.

**Note**

Before configuring layer 4 **src-port** and **dest-port** options, configure the IP protocol number using the **ip-proto** option. If a layer 4 IP protocol is not configured, the default value (256) is used and the filter groups configured with multiple filters will fail.

When matching the source or destination addresses, the filter ANDs the mask value with the filter's corresponding IP address. The filter then ANDs the mask with the packet's actual IP address and compares the two values. If they are the same, the filter matches the packet.

For example, if you specify a **src-ip** of 192.168.100.0 and a **src-mask** of 255.255.255.0, the filter matches all packets that have a source IP address in the range of 192.168.100.0 through 192.168.100.255. Use a mask value of 0.0.0.0 (default) to match all IP addresses. Use a mask value of 255.255.255.255 to match one specific IP address.

Similarly, when comparing TOS values, the filter ANDs the *tos-mask* parameter with the *tos-value* parameter and compares it to the result of ANDing the *tos-mask* parameter with the packet's actual TOS value. If the two values are the same, the filter matches the packet.

**Note**

For the filter group to work for CMs, a CM must re-register after the CMTS router is configured.

**Cable Subscriber Management Guidelines**

Cable subscriber management is a DOCSIS 1.1 specification, whose functionality can be established using the following configuration methods:

- CMTS router configuration (via CLI)
- SNMP configuration
- DOCSIS 1.1 configuration file (TLVs 35, 36, and 37)

There are certain CMTS configuration requirements if the CM DOCSIS 1.1 configuration file is not used to activate cable subscriber management for the CPE. Specifically, if the docsSubMgtCpeActive object is not provisioned using TLVs 35, 36, and 37 in the DOCSIS 1.1 CM configuration file, then the object uses the docsSubMgtCpeActiveDefault object setting, which is false. This means that cable subscriber management functionality is disabled.

Therefore, if you do not provision TLVs 35, 36, and 37, then you must activate the functionality by specifying the **cable submgmt default active** global configuration command on the CMTS router.

**Note**

Since TLVs 35, 36, and 37 do not apply to DOCSIS 1.0 CM configuration files, the only way to enable cable subscriber management for a DOCSIS 1.0 CM is to configure it explicitly on the CMTS router and activate it by using the **cable submgmt default active** global configuration command.

## IPv6 Cable Filter Group Guidelines



### Note

When parallel eXpress forwarding (PXF) is configured on the Cisco uBR10012 router, either the interface ACL (**ip access-list** command) or the **cable filter group** commands can be used to filter the packets.

Consider the following restrictions and guidelines when configuring IPv6 cable filter groups:

- Chained IPv6 headers are not supported.
- If you need to support IPv4 and IPv6 filters for the same filter group, then you must use a separate index number with the same filter group ID, and configure one index as **ip-version ipv4**, and the other index as **ip-version ipv6**.

## Examples

The following example shows configuration of an IPv4 filter group that drops packets with a source IP address of 10.7.7.7 and a destination IP address of 10.8.8.8, and a source port number of 2000 and a destination port number of 3000. All protocol types and ToS and TCP flag values are matched:

```
configure terminal
cable filter group 10 index 10 src-ip 10.7.7.7
cable filter group 10 index 10 src-mask 255.255.0.0
cable filter group 10 index 10 dest-ip 10.8.8.8
cable filter group 10 index 10 dest-mask 255.255.0.0
cable filter group 10 index 10 ip-protocol 256
cable filter group 10 index 10 src-port 2000
cable filter group 10 index 10 dest-port 3000
cable filter group 10 index 10 tcp-flags 0 0
cable filter group 10 index 10 match-action drop
```

## IPv6 Example

The following example shows the configuration of an IPv6 filter group that drops traffic from a specific IPv6 host (with source address 2001:33::20B:BFFF:FEA9:741F/128) behind a cable router to an IPv6 host on the network (with destination address 2001:1::224/128):

```
configure terminal
!
! Specify the filter group criteria using ID 254
!
cable filter group 254 index 128 v6-src-address 2001:33::20B:BFFF:FEA9:741F
cable filter group 254 index 128 v6-src-pfxlen 128
cable filter group 254 index 128 v6-dest-address 2001:1::224
cable filter group 254 index 128 v6-dest-pfxlen 128
!
! Specify that the filter group is IPv6
!
cable filter group 254 index 128 ip-version IPv6
!
! Specify the drop action for matching packets
!
cable filter group 254 index 128 match-action drop
!
! Apply the filter group with ID 254 to all CM upstream traffic
!
cable submgmt default filter-group cm upstream 254
```

| Related Commands | Command                      | Description                                                                                                                                                     |
|------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>show cable filter</b>     | Displays the DOCSIS 1.1 filter groups that are currently defined.                                                                                               |
|                  | <b>cable submgmt default</b> | Sets the default values for attributes in the Subscriber Management MIB (DOCS-SUBMGT-MIB), and enables the Cisco Static CPE Override feature on the Cisco CMTS. |

# cable flap-list aging

To specify the number of days to keep a CM in the flap-list table before aging it out of the table, use the **cable flap-list aging** command in global configuration mode. To disable this feature, use the **no** form of this command.

**cable flap-list aging** *minutes*

**no cable flap-list aging**

## Syntax Description

*minutes* Specifies how long, in minutes, that a CM remains in the flap list. The valid range is 1 to 86400, with a default of 10080 minutes.

## Command Default

The default length of time that a CM is kept in the flap-list table is 10080 minutes (1 week).

## Command Modes

Global configuration (config)

## Command History

| Release                    | Modification                                                                                                       |
|----------------------------|--------------------------------------------------------------------------------------------------------------------|
| 11.3 NA                    | This command was introduced.                                                                                       |
| 12.0(4)XA, 12.1 T, 12.1 EC | The <i>days</i> parameter was removed.                                                                             |
| 12.3BC                     | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA                | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

Flapping refers to the rapid disconnecting and reconnecting of a CM that is having problems holding its connection to the CMTS. A flap list is a table maintained by the Cisco CMTS for every modem (active or not) that is having communication difficulties. The flap list contains modem MAC addresses and logs the time of the most recent activity. You can configure the size and entry thresholds for the flap list.

## Examples

The following example shows how to specify that the flap-list table retain 2400 minutes (40 hours) of performance for this CM:

```
Router(config)# cable flap-list aging 2400
```

## Related Commands

| Command                                       | Description                                                                               |
|-----------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>cable flap-list insertion-time</b>         | Sets the insertion time interval that determines whether a CM is placed in the flap list. |
| <b>cable flap-list miss-threshold</b>         | Specifies miss threshold for recording a flap-list event.                                 |
| <b>cable flap-list power-adjust threshold</b> | Specifies the power-adjust threshold for recording a CM flap-list event.                  |

| Command                      | Description                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>cable flap-list size</b>  | Specifies the maximum number of CMs that can be listed in the flap-list table.                            |
| <b>clear cable flap-list</b> | Clears all the entries in the flap-list table.                                                            |
| <b>debug cable flap</b>      | Displays information about the operation of the CM flap list that is maintained for the cable interfaces. |
| <b>ping docsis</b>           | Sends a DOCSIS ping to a CM and increments the flap-list counters as appropriate.                         |
| <b>show cable flap-list</b>  | Displays the current contents of the flap list.                                                           |

# cable flap-list insertion-time

To set the cable flap-list insertion time interval, use the **cable flap-list insertion-time** command in global configuration mode. To disable insertion time, use the **no** form of this command.

**cable flap-list insertion-time** *seconds*

**no cable flap-list insertion-time**

## Syntax Description

*seconds* Insertion time interval in seconds. Valid values are from 60 to 86,400 seconds. The default value is 180 seconds (3 minutes).

## Command Default

The default insertion time interval is 180 seconds (3 minutes).

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.1 T      | This command was introduced.                                                                                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

This command controls the operation of a flapping modem detector. When a CM makes two or more initial Ranging Requests (also known as insertion or reinsertion requests) within the period of time defined by this command, the CM is placed in the flap list. A CM is not put into the flap list if the time between its two consecutive initial Ranging Requests is greater than the insertion time interval.

For example, if the CMTS is configured for the default insertion time of three minutes, and if the CM reinserts itself four minutes after its last insertion, the CM is not placed in the flap list. However, if the CM reinserts itself two minutes after its last insertion, the CM is placed in the flap list.

Also, a CM is put into the flap list only once for each insertion time interval, even if the CM reinserts itself multiple times. For example, if the CMTS is set for the default insertion time interval of 3 minutes, and the CM reinserts itself three times within that period, the flap list will show that the CM has flapped once. If the CM reinserts itself three times within the first 3 minute period and three more times within the next 3 minute period, the flap list will show that the CM has flapped twice.

## Examples

The following example shows how to set the insertion time interval to 62 seconds:

```
Router(config)# cable flap-list insertion-time 62
```

| Related Commands | Command                                       | Description                                                                                               |
|------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                  | <b>cable flap-list aging</b>                  | Specifies the number of days to keep a CM in the flap-list table before aging it out of the table.        |
|                  | <b>cable flap-list miss-threshold</b>         | Specifies miss threshold for recording a flap-list event.                                                 |
|                  | <b>cable flap-list power-adjust threshold</b> | Specifies the power-adjust threshold for recording a CM flap-list event.                                  |
|                  | <b>cable flap-list size</b>                   | Specifies the maximum number of CMs that can be listed in the flap-list table.                            |
|                  | <b>clear cable flap-list</b>                  | Clears all the entries in the flap-list table.                                                            |
|                  | <b>debug cable flap</b>                       | Displays information about the operation of the CM flap list that is maintained for the cable interfaces. |
|                  | <b>ping docsis</b>                            | Sends a DOCSIS ping to a CM and increments the flap-list counters as appropriate.                         |
|                  | <b>show cable flap-list</b>                   | Displays the current contents of the flap list.                                                           |



# cable flap-list miss-threshold

To set the miss threshold for recording a flap-list event, use the **cable flap-list miss-threshold** command in global configuration mode. To disable this function, use the **no** form of this command.

**cable flap-list miss-threshold** *misses*

**no cable flap-list miss-threshold**

## Syntax Description

*misses* Specifies the number of consecutive MAC-layer keepalive (Station Maintenance) that can be missed before a CM is placed in the flap list. The valid range is 1 to 12, with a default of 6.

## Command Default

The default number of station maintenance messages that can be missed is 6.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.1 T      | This command was introduced.                                                                                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

In a DOCSIS network, the CMTS regularly sends out MAC-layer keepalive messages, known as station maintenance messages, to each CM that is online. If a CM does not respond to a station maintenance message, the CMTS repeats sending these messages either until the CM responds or the CMTS reaches the maximum allowable number of messages that can be sent.

The **cable flap-list miss-threshold** command specifies how many consecutive station maintenance messages can be missed before the cable modem is placed in the flap list. A miss occurs when a CM does not reply to a station maintenance message.



### Note

Station maintenance messages are occasionally lost due to noise or congestion in a typical DOCSIS network, with a loss rate of approximately 8 percent considered nominal. A higher miss rate can indicate RF plant problems, such as intermittent upstream problems, fiber laser clipping, or common-path distortion.

## Examples

The following example shows how to set the miss threshold to 5:

```
Router(config)# cable flap-list miss-threshold 5
```

| Related Commands | Command                                       | Description                                                                                               |
|------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                  | <b>cable flap-list aging</b>                  | Specifies the number of days to keep a CM in the flap-list table before aging it out of the table.        |
|                  | <b>cable flap-list insertion-time</b>         | Sets the insertion time interval that determines whether a CM is placed in the flap list.                 |
|                  | <b>cable flap-list power-adjust threshold</b> | Specifies the power-adjust threshold for recording a CM flap-list event.                                  |
|                  | <b>cable flap-list size</b>                   | Specifies the maximum number of CMs that can be listed in the flap-list table.                            |
|                  | <b>clear cable flap-list</b>                  | Clears all the entries in the flap-list table.                                                            |
|                  | <b>debug cable flap</b>                       | Displays information about the operation of the CM flap list that is maintained for the cable interfaces. |
|                  | <b>ping docsis</b>                            | Sends a DOCSIS ping to a CM and increments the flap-list counters as appropriate.                         |
|                  | <b>show cable flap-list</b>                   | Displays the current contents of the flap list.                                                           |

# cable flap-list power-adjust threshold

To specify the power-adjust threshold for recording a flap-list event, use the **cable flap-list power-adjust threshold** command in global configuration mode. To disable power-adjust thresholds, use the **no** form of this command.

**cable flap-list power-adjust threshold *dB***

**no cable flap-list power-adjust threshold**

## Syntax Description

*dB* Specifies the minimum power adjustment, in decibels, that results in a flap-list event. Valid values are from 1 to 10 dB.

## Command Default

The default minimum power adjustment threshold is 2 dB.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.1 T      | This command was introduced.                                                                                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

This command controls the operation of a flapping modem detector. When the power adjustment of a CM exceeds the configured threshold value, the modem is placed in the flap list.



### Note

A power adjustment threshold of less than 2 dB might cause excessive flap-list event recording. Cisco recommends setting this threshold value to 3 dB or higher.



### Note

For underground HFC networks with 4 amplifier cascade length, a typical threshold value should be 3 dB. For overhead HFC networks with 4 amplifier cascade length, a typical threshold value should be 4 dB. Longer coaxial cascades without return path thermal gain control and sites with extreme daily temperatures will have larger threshold ranges.

## Examples

The following example shows the power-adjust threshold being set to 5 dB:

```
Router(config)# cable flap-list power-adjust threshold 5
```

| Related Commands | Command                               | Description                                                                                               |
|------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                  | <b>cable flap-list aging</b>          | Specifies the number of days to keep a CM in the flap-list table before aging it out of the table.        |
|                  | <b>cable flap-list insertion-time</b> | Sets the insertion time interval that determines whether a CM is placed in the flap list.                 |
|                  | <b>cable flap-list miss-threshold</b> | Specifies miss threshold for recording a flap-list event.                                                 |
|                  | <b>cable flap-list size</b>           | Specifies the maximum number of CMs that can be listed in the flap-list table.                            |
|                  | <b>clear cable flap-list</b>          | Clears all the entries in the flap-list table.                                                            |
|                  | <b>debug cable flap</b>               | Displays information about the operation of the CM flap list that is maintained for the cable interfaces. |
|                  | <b>ping docsis</b>                    | Sends a DOCSIS ping to a CM and increments the flap-list counters as appropriate.                         |
|                  | <b>show cable flap-list</b>           | Displays the current contents of the flap list.                                                           |

## cable flap-list size

To specify the maximum number of CMs that can be displayed from the flap-list table, use the **cable flap-list size** command in global configuration mode. To reset it to the default flap-list table size, use the **no** form of this command.

**cable flap-list size** *number*

**no cable flap-list size**

|                           |               |                                                                                                                                        |
|---------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> | Maximum number of CMs to be displayed. Valid values are from 1 to 8191 depending on the type of line cards, with a default of 100 CMs. |
|---------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------|

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.1 T         | This command was introduced. |

- Usage Guidelines**
- The flap-list size is determined by the architecture of the CMTS and the cable line cards. Previously, the cable flap-list tables were stored on the Route Processors and Performance Routing Engine (PRE) modules.
  - The legacy non-distributed cable line cards, Cisco uBR-MC16C/MC16E/MC16S line card and Cisco uBR-MC28C/MC28E line card did not store the flap-list tables in the line cards.
  - The distributed line cards are designed such that they store the flap-list tables on the line cards. For a CMTS using distributed line cards, the flap-list size is the maximum size per line card.
  - The distributed line cards supported on a Cisco uBR7200 router are Cisco uBR-MC28U/X and Cisco uBR-16U/16X.
  - The distributed line cards supported on a Cisco uBR10012 router are Cisco uBR10-MC5X20S/U/H.
  - You can calculate the flap list sizes using the following formulas:
    - For a Cisco uBR10012 router without line card high availability (LC-HA)— $8191 * (\text{Number of cable line cards})$
    - For a Cisco uBR10012 router with line card high availability (LC-HA)— $8191 * (\text{Number of cable line cards} - 1)$
    - For a Cisco uBR72VXR router using legacy and distributed line cards— $8191 * (1 + \text{Number of distributed cable line cards})$
  - The flap-list tables sizes are as follows:
    - A fully loaded Cisco uBR10012 routerWith distributed line cards and no LC-HA configured— $8191 * 8 = 65528$  CMs.

With distributed line cards and LC-HA configured— $8191 * (8-1) = 57337$  CMs.



**Note** Legacy line cards behave as the distributed line cards on a Cisco uBR10012 router. Thus, the flap-list sizes are same as for distributed line cards.

- A fully loaded Cisco uBR7246VXR router

With distributed line cards—  $8191 * 6 = 49146$  CMs.

With legacy line cards— $8191 * (1+0) = 8191$  CMs.

With legacy and distributed line cards—  $8191 * (1 + \text{no of the distributed line cards})$  CMs.

### Examples

The following example shows how to display a maximum of 200 flap-list entries:

```
Router#configure terminal
Router(config)#cable flap-list size 200
Router(config)#
```

### Related Commands

| Command                                       | Description                                                                                               |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>cable flap-list aging</b>                  | Specifies the number of days to keep a CM in the flap-list table before aging it out of the table.        |
| <b>cable flap-list insertion-time</b>         | Sets the insertion time interval that determines whether a CM is placed in the flap list.                 |
| <b>cable flap-list miss-threshold</b>         | Specifies miss threshold for recording a flap-list event.                                                 |
| <b>cable flap-list power-adjust threshold</b> | Specifies the power-adjust threshold for recording a CM flap-list event.                                  |
| <b>clear cable flap-list</b>                  | Clears all the entries in the flap-list table.                                                            |
| <b>debug cable flap</b>                       | Displays information about the operation of the CM flap list that is maintained for the cable interfaces. |
| <b>ping docsis</b>                            | Sends a DOCSIS ping to a CM and increments the flap-list counters as appropriate.                         |
| <b>show cable flap-list</b>                   | Displays the current contents of the flap list.                                                           |

# cable freq-range

To configure the Cisco CMTS router for the range of frequencies that are acceptable on upstreams, use the **cable freq-range** command in global configuration mode. To restore the default value (which is based on the cable interface and on the Annex A/B configuration), use the **no** form of this command.

**cable freq-range** [european | japanese | north-american]

**no cable freq-range**



## Note

The frequency range specified in this command does not apply to upstreams of the Cisco uBR-MC3GX60V cable interface line cards. To specify the upstream frequency for the Cisco uBR-MC3GX60V cable interface line card, use the **cable upstream frequency** command.

## Syntax Description

|                       |                                                                                                                                          |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>european</b>       | Configures the Cisco CMTS router to accept upstream frequency ranges that conform with the EuroDOCSIS specifications (5 MHz to 65 MHz).  |
| <b>japanese</b>       | Configures the Cisco CMTS router to accept upstream frequency ranges that conform to the extended range used in Japan (5 MHz to 55 MHz). |
| <b>north-american</b> | Configures the Cisco CMTS router to accept upstream frequency ranges that conform to the DOCSIS specifications (5 MHz to 42 MHz).        |

## Command Default

**no cable freq-range**, which defaults to a frequency range based on the Annex configuration:

- Annex A = **european** (EuroDOCSIS, 5 MHz to 65 MHz)—Supported only on cable interfaces that support EuroDOCSIS
- Annex B = **north-american** (DOCSIS, 5 MHz to 55 MHz)—All cable interfaces support the 5 MHz to 42 MHz range. The 42 MHz to 55 MHz range is supported only on certain cable interfaces.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers.               |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

In Cisco IOS Release 12.2(15)BC2 and later, the Cisco CMTS router supports three different modes of operation, depending on the cable interface line cards being used. The range of frequencies that are allowed in each mode are as follows:

- North American DOCSIS (Annex B)—Upstreams use frequencies between 5 MHz and 42 MHz. This range is supported by all cable interface line cards.

- European EuroDOCSIS (Annex A)—Upstreams use frequencies between 5 MHz and 65 MHz.
- Japanese Extended Range (Annex B)—Upstreams use frequencies between 5 MHz and 55 MHz.

To configure the router so that it supports the proper range of upstream frequencies, use the **upstream freq-range** command. After you have configured the router with the **cable freq-range** command, the **cable upstream frequency** and **cable spectrum-group (interface configuration)** commands then accept only frequencies that are in the configured range.

Typically, the **upstream freq-range** command is not needed because the default behavior covers the most common configurations. However, this command can be used in the following situations:

- This command is required to enable EuroDOCSIS operations on the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cards.
- This command is never needed for the Cisco uBR-MC5X20U card nor for EuroDOCSIS cable interfaces (Cisco uBR-MC16E card, and the Cisco uBR7111E and Cisco uBR7114E routers), because these interfaces default to the EuroDOCSIS range of frequencies. However, if you have previously used this command to restrict the allowable range of frequencies, you must use the **european** option to re-enable the EuroDOCSIS range of frequencies.
- The **north-american** option is usually not needed, because this is the default mode of operations for all DOCSIS cable interfaces. However, this option can be useful on the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cards when noise exists on the frequencies above 42 MHz. In this situation, using the **north-american** option filters out the higher frequencies and reduces the impact of that noise.
- Similarly, the **japanese** option is not needed on those cable interface cards that support it, because this is the default configuration on those cards. However, if you have previously used the **north-american** option on an interface, you need to use the **japanese** option to re-enable the extended frequency range.
- Even when the **upstream freq-range** command is not needed to enable a frequency range, using it ensures that the **cable upstream frequency** and **cable spectrum-group** commands allow only frequencies that are within the desired range. This can help operators from assigning invalid frequencies to upstreams.

**Tip**

If one or more cable interface line cards that are installed in the chassis do not support the frequency range that you select with this command, the command displays an informational warning message for each of those cable interface cards. Also, you cannot configure the router for a particular frequency range if an upstream or spectrum group on the router is currently configured for a frequency that is invalid for the new range. If you try to do so, the command is ignored and a warning message is printed prompting you to reconfigure the upstream or spectrum group before retrying the command.

**Note**

This command configures only the range of frequencies that can be configured on an upstream. It does not configure the upstreams for the DOCSIS (Annex B) or EuroDOCSIS (Annex A) modes of operation, which is done using the **cable downstream annex** interface command. (Annex C mode is not supported.) You must configure the downstream for Annex A for EuroDOCSIS operations and Annex B for DOCSIS operations. You can configure certain cable interface cards (such as the Cisco uBR-MC28U) for both the DOCSIS Annex B mode and the EuroDOCSIS frequency range, but this violates the DOCSIS specifications and should not be used on standard DOCSIS networks.

The allowable range for the upstream channel frequency depends on the cable interface line card and Cisco IOS software release being used. See [Table 2-11](#) for the currently supported values.



**Table 0-9 Allowable Frequency Range for Cable Interface Line Cards**

| Frequency Range | Supported Cable Interfaces                                                                                                         | Minimum Cisco IOS Releases                                                                                                                                                                                                                               |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 to 42 MHz     | All cable interfaces                                                                                                               | All releases supported for the Cisco CMTS                                                                                                                                                                                                                |
| 5 to 55 MHz     | Cisco uBR-MC16E,<br>Cisco uBR-MC16U/X,<br>Cisco uBR-MC28U/X,<br>Cisco uBR-MC5X20U                                                  | Cisco IOS Release 12.2(15)BC2                                                                                                                                                                                                                            |
| 5 to 65 MHz     | Cisco uBR-MC16E,<br>Cisco uBR-MC16U/X,<br>Cisco uBR-MC28U/X,<br>Cisco uBR-MC5X20U,<br>Cisco uBR7111E and<br>Cisco uBR7114E routers | Cisco IOS Release 12.0(13)SC and 12.1(4)EC for<br>Cisco uBR-MC16E<br><br>Cisco IOS Release 12.1(5)EC1 for Cisco uBR711E<br>and Cisco uBR7114E<br><br>Cisco IOS Release 12.2(15)BC2 for<br>Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and<br>Cisco uBR-MC5X20U |

**Note**

The **cable freq-range** command fails if any upstreams or spectrum groups on the router are currently configured for a frequency that is outside the new range being selected. You must reconfigure those upstreams or spectrum groups, using the **cable upstream frequency** or **cable spectrum-group** commands, for lower frequencies, and then repeat the **cable freq-range** command.

**Examples**

The following example shows how to configure the Cisco CMTS router to support the EuroDOCSIS upstream frequency range of 5 MHz to 65 MHz. The router then displays a list of the cable interface line cards, if any, that do not support this range. After giving this command, the **cable upstream frequency** command shows the valid range of upstream frequencies as being the EuroDOCSIS range:

```
Router# configure terminal
Router(config)# cable freq-range european

Interface Cable3/0 does not support European frequency range
Interface Cable3/1 does not support European frequency range
Interface Cable5/0 does not support European frequency range
Interface Cable5/1 does not support European frequency range

Router(config)# interface cable 6/0 ! This cable interface supports EuroDOCSIS
Router(config-if)# cable upstream 0 frequency ?

<5000000-65000000> Return Frequency in HZ

Router(config-if)#
```

The following example shows how to configure the Cisco CMTS router to support the extended Japanese upstream frequency range of 5 MHz to 55 MHz. The router then displays a list of the cable interface line cards, if any, that do not support this range. After giving this command, the **cable upstream frequency** command shows the valid range of upstream frequencies as being the extended frequency range for Japanese networks:

```
Router# configure terminal
Router(config)# cable freq-range japanese

Interface Cable3/0 does not support Japanese frequency range
```

```
Interface Cable4/0 does not support Japanese frequency range
Interface Cable5/0 does not support Japanese frequency range
```

```
Router(config)# interface cable 6/0 ! This cable interface supports the Japanese range
Router(config-if)# cable upstream 0 frequency ?
```

```
<5000000-55000000> Return Frequency in HZ
```

The following example shows how to configure the Cisco CMTS router for its default configuration (DOCSIS upstream frequency range of 5 MHz to 42 MHz). (No warning messages are displayed with this configuration because all cable interface line cards support the basic DOCSIS frequency range.) After giving this command, the **cable upstream frequency** command shows the valid range of upstream frequencies as being the DOCSIS range:

```
Router# configure terminal
Router(config)# cable freq-range north-american
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 0 frequency ?
```

```
<5000000-42000000> Return Frequency in HZ
```

The following example shows all of the commands that are needed to configure the cable interface and upstream on a Cisco uBR-MC28U/X cable interface line card to support a frequency in the EuroDOCSIS upstream frequency range of 5 MHz to 65 MHz:

```
Router# configure terminal
Router(config)# cable freq-range european
Router(config)# interface 3/0
Router(config-if)# cable downstream annex a
Router(config-if)# cable upstream 0 frequency 62500000
```

The following example shows the **cable freq-range** command failing because an upstream is configured for a frequency that is invalid for the new range. The upstream must be reconfigured before the **cable freq-range** command can be given successfully.

```
Router# configure terminal
Router(config)# cable freq-range japanese

%%Interface Cable 3/0/U0 has invalid frequency (62500000 Hz) for specified range
%%Set upstream frequencies within range prior to changing freq-range

Router(config)# interface 3/0
Router(config-if)# cable upstream 0 frequency 38600000
Router(config-if)# exit
Router(config)# cable freq-range japanese
```

## Related Commands

| Command                         | Description                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable downstream annex</b>   | Sets the Motion Picture Experts Group (MPEG) framing format for a downstream port on a cable interface line card. |
| <b>cable upstream frequency</b> | Configures a fixed frequency of the upstream radio frequency (RF) carrier for an upstream port.                   |

# cable helper-address

To specify a destination IP address for User Datagram Protocol (UDP) broadcast Dynamic Host Configuration Protocol (DHCP) packets, use the **cable helper-address** command in cable interface or subinterface configuration mode. To disable this feature, use the **no** form of this command.

**cable helper-address** *IP-address* [**cable-modem** | **host** | **mta** | **stb**]

**no cable helper-address** *IP-address* [**cable-modem** | **host** | **mta** | **stb**]

## Syntax Description

|                    |                                                                                           |
|--------------------|-------------------------------------------------------------------------------------------|
| <i>IP-address</i>  | The IP address of a DHCP server to which UDP broadcast packets will be sent.              |
| <b>cable-modem</b> | (Optional) Specifies that only CM UDP broadcasts are forwarded.                           |
| <b>host</b>        | (Optional) Specifies that only host UDP broadcasts are forwarded.                         |
| <b>mta</b>         | (Optional) Specifies that only media terminal adapter (MTA) UDP broadcasts are forwarded. |
| <b>stb</b>         | (Optional) Specifies that only set-top box (STB) UDP broadcasts are forwarded.            |

## Command Default

If no options are specified, both CM and host UDP broadcasts are forwarded.

## Command Modes

Interface configuration—cable interface only (config-if)  
Subinterface configuration—cable interface only (config-subif)

## Command History

| Release     | Modification                                                                                                          |
|-------------|-----------------------------------------------------------------------------------------------------------------------|
| 12.1 T      | This command was introduced.                                                                                          |
| 12.1(3a)EC  | This command was modified to add the subinterface support.                                                            |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.3(33)SCB and the <b>mta</b> and <b>stb</b> keywords were added. |

## Usage Guidelines

This command enables CMs and their attached CPE devices (hosts) to use separate DHCP servers, so that CMs and hosts receive their IP addresses from separate address pools. The **cable-modem** keyword specifies that only UDP DHCP broadcasts from CMs are forwarded to that particular destination IP address. The **host** keyword specifies that only UDP broadcasts from hosts (CPE devices) are forwarded to that particular destination IP address.



### Note

You must specify both the **cable-modem** or **host** options in separate commands, using separate IP addresses, if you decide to use them. If you specify only one option, then the other type of device (cable modem or host) will not be able to connect with a DHCP server. In addition, if you use the **cable-modem** or **host** option with the same IP address that was previously configured with this command, the new configuration overwrites the old configuration.

**Note**

Starting with Cisco IOS Release 12.2(33)SCG, if you use the **cable-modem** or **host** option with the same IP address that was previously configured with this command on the Cisco uBR10012 and Cisco uBR7200 series routers, the new configuration does not overwrite the old configuration. It is configured under a bundle interface.

The **cable helper-address** command is similar to the **ip helper-address** command, but the **cable helper-address** command has been enhanced for cable interfaces and DOCSIS networks to allow separate helper addresses for CMs and hosts. Use only the **cable helper-address** command on cable interfaces, and use the **ip helper-address** command on all non-cable interfaces.

The **cable helper-address** command, as is the case with the **ip helper-address** command, cannot be used on slave interfaces, so these commands are automatically removed from an interface configuration when the interface is configured as a slave interface. Slave interfaces use the IP configuration of the master interface, which includes not only the IP address for the interface itself, but also the helper addresses that have been configured on the master interface.

**Tip**

You can repeat this command to specify any number of helper addresses, but the Cisco IOS software uses only the first 16 valid addresses that are configured on each interface (using either the **cable helper-address** command or the **ip helper-address** command) when forwarding DHCP requests.

**Examples**

The following example shows how to forward UDP broadcasts from both CMs and CPE devices to the DHCP server at 172.23.66.44:

```
Router(config)# interface cable 1/0
Router(config-if)# cable helper-address 172.23.66.44
Router(config-if)# exit
Router(config)#
```

The following example shows how to forward UDP broadcasts from CMs and CPE devices to separate DHCP servers:

```
Router(config)# interface cable 6/0
Router(config-if)# cable helper-address 172.23.66.143 host
Router(config-if)# cable helper-address 172.23.66.144 cable-modem
Router(config-if)# exit
Router(config)#
```

The following example shows that when you specify the **cable-modem** and **host** options with the same IP address, the second command overwrites the first one:

```
Router(config)# interface cable 3/0
Router(config-if)# cable helper-address 10.10.10.13 host
Router(config-if)# cable helper-address 10.10.10.13 cable-modem
Router(config-if)# exit
Router(config)# exit
Router# show running-config | include helper-address
```

```
cable helper-address 10.10.10.13 cable-modem
```

```
Router#
```

The following example shows that when you specify the **cable-modem** and **host** options with the same IP address on a Cisco uBR10012 router running Cisco IOS Release 12.2(33)SCG and later, it is configured under a bundle interface:

```

Router(config)# interface cable 3/0
Router(config-if)# cable helper-address 10.10.10.13 host
Router(config-if)# cable helper-address 10.10.10.13 cable-modem
Router(config-if)# end
Router# show running-config | include helper-address
cable helper-address 10.10.10.13 cable-modem
cable helper-address 10.10.10.13 host

Router#

```

| Related Commands | Command                                         | Description                                                                                                                             |
|------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dhcp-giaddr</b>                        | Modifies the GIADDR field of DHCPDISCOVER and DHCPREQUEST packets with a Relay IP address before they are forwarded to the DHCP server. |
|                  | <b>cable relay-agent-option</b>                 | Enables the system to insert the CM MAC address into a DHCP packet received from a CM or host and forward the packet to a DHCP server.  |
|                  | <b>cable source-verify</b>                      | Turns on CM upstream verification.                                                                                                      |
|                  | <b>cable telco-return spd dhcp-authenticate</b> | Enforces the telco-return CM to use a specific Dynamic Host Configuration Protocol (DHCP) server.                                       |
|                  | <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the Dynamic Host Configuration Protocol (DHCP) server that the telco-return CM must access.                |
|                  | <b>ip dhcp relay information option</b>         | Enables the system to insert the CM MAC address into a DHCP packet received from a CM or host and forward the packet to a DHCP server.  |
|                  | <b>ip dhcp smart-relay</b>                      | Monitors client retransmissions when address pool depletion occurs.                                                                     |

## cable host access-group

To configure the access list for a customer premises equipment (CPE) device or host on the Cisco CMTS router, use the **cable host** command in privileged EXEC mode. To remove an access list, use this command with the **no access-group** option.

**cable host** {*ip-address* | *mac-address*} **access-group** {*access-list* | *access-name*}

**cable host** {*ip-address* | *mac-address*} **no access-group**

### Syntax Description

|                                             |                                                                                                                      |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>                           | IP address of the CPE device or host.                                                                                |
| <i>mac-address</i>                          | MAC address of the CPE device or host.                                                                               |
| <b>access-group</b>                         | Enables <b>access-group</b> options. The <b>no</b> form removes access-group specifications.                         |
| { <i>access-list</i>   <i>access-name</i> } | Specifies the IP access list (standard or extended), either by access-list number (1 to 199) or by access-list name. |

### Command Default

None

### Command Modes

Privileged EXEC (#)

### Command History

| Release     | Modification                                                                                                                                                              |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced.                                                                                                                                              |
| 12.2(4)BC1  | The functionality of this command was made identical to that of the <b>cable modem access-group</b> command, but both commands were retained for backwards compatibility. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                        |

### Usage Guidelines

For the **vrf** keyword of this command, only the *ip-address* option is supported.

An access list can be configured to deny access to any IP address other than the ones previously configured, using the **access-list access-list deny any any** command. Starting with Cisco IOS Release 12.2(33)SCD, when a CM is added to such an access list on the Cisco uBR10012 and Cisco uBR7200 series universal broadband routers, the ping fails. If the CM is reset, removed, or powered off, the ping succeeds after the CM comes online. However, the **show cable modem access-group** command displays that the CM does not belong to the access-group.



#### Note

The **cable host** command, and its SNMP equivalent, `cdxCmCpeAccessGroup`, are not supported on the Cisco uBR10012 universal broadband router. On this router, use the standard DOCSIS MIB, DOCS-SUBMGT-MIB, instead.

**Tip**

This command is equivalent to configuring `cdxCmCpeAccessGroup` in CISCO-DOCS-EXT-MIB.

**Examples**

The following example shows how to assign access list number 2 to the cable host with an IP address of 10.1.1.1:

```
Router# cable host 10.1.1.1 access-group 2
```

**Related Commands**

| Command                               | Description                                                                           |
|---------------------------------------|---------------------------------------------------------------------------------------|
| <b>clear cable host</b>               | Clears the host from the internal address tables of the Cisco CMTS router.            |
| <b>cable device</b>                   | Configures an access list for a CM device or host on the Cisco CMTS router.           |
| <b>cable modem access-group</b>       | Configures the access-group for a CM on the Cisco CMTS router.                        |
| <b>show cable device access-group</b> | Display the CMs and the hosts behind the CMs on the network on the Cisco CMTS router. |
| <b>show cable host access-group</b>   | Displays the hosts behind the CMs on the network on the Cisco CMTS router.            |

# cable high-priority-call-window

To set the call window (in minutes) during which the Cisco CMTS router maintains records of Emergency 911 calls, use the **cable high-priority-call-window** command in global configuration mode. To remove the call window configuration from the Cisco CMTS router, use the **no** form of this command:

**cable high-priority-call-window** *minutes*

**no cable high-priority-call-window**

## Syntax Description

*window* This value defines the length of time, in minutes, for which E911 Call History is to be maintained.

## Command Default

This command and the PacketCable Emergency 911 Services Listing and History feature is disabled by default on the Cisco CMTS.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                                                                                                                                  |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced supporting PacketCable Emergency 911 Services Listing and History on the Cisco CMTS: <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router</li> <li>• Cisco uBR10012 router</li> </ul> |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                            |

## Usage Guidelines

The following command example configures the call window on the Cisco uBR10012 router to be 1 minute in length:

```
Router(config)# cable high-priority-call-window 1
```

To observe Emergency 911 calls made within the configured window, use the **show cable calls** command in privileged EXEC mode:

The following command example illustrates that one Emergency 911 call was made on the Cable8/1/1 interface on the Cisco uBR10012 router during the window set for high priority calls:

```
Router# show cable calls
Interface ActiveHiPriCalls ActiveAllCalls PostHiPriCallCms RecentHiPriCms
Cable5/0/0 0 0 0 0
Cable5/0/1 0 0 0 0
Cable5/1/0 0 0 0 0
Cable5/1/1 0 0 0 0
Cable5/1/2 0 0 0 0
Cable5/1/3 0 0 0 0
Cable5/1/4 0 0 0 0
Cable6/0/0 0 0 0 0
```



|            |   |   |   |   |
|------------|---|---|---|---|
| Cable6/0/1 | 0 | 0 | 0 | 0 |
| Cable7/0/0 | 0 | 0 | 0 | 0 |
| Cable7/0/1 | 0 | 0 | 0 | 0 |
| Cable8/1/0 | 0 | 0 | 0 | 0 |
| Cable8/1/1 | 1 | 1 | 0 | 0 |
| Cable8/1/2 | 0 | 0 | 0 | 0 |
| Cable8/1/3 | 0 | 0 | 0 | 0 |
| Cable8/1/4 | 0 | 0 | 0 | 0 |
| Total      | 1 | 1 | 0 | 0 |

## Related Commands

| Command                       | Description                                                                                                                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>show cable calls</b>       | Displays voice call history information and status for the PacketCable Emergency 911 Services Listing and History feature. |
| <b>show cable modem calls</b> | Displays voice call information for a particular cable modem.                                                              |

# cable igmp static-group

To configure cable per-physical-downstream static multicast support on the Cisco CMTS router, use the **cable igmp static-group** command in global configuration mode.

**cable igmp static-group** *multicast-group-ip* [**source** *source-ip*] [*subinterface*]

## Syntax Description

|                                                                                                                                                                                                  |                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <i>multicast-group-ip</i>                                                                                                                                                                        | IP address of the multicast group.                                                                                  |
| <b>source</b> <i>source-ip</i>                                                                                                                                                                   | (Optional) Source IP address for SSM.                                                                               |
| <i>subinterface</i>                                                                                                                                                                              | (Optional) Subinterface number: <ul style="list-style-type: none"> <li>default: 0 for the main interface</li> </ul> |
| <b>Note</b> If the subinterface is configured at the virtual bundle interface, the subinterface number option for this CLI must be configured to match up with the desired subinterface devices. |                                                                                                                     |

## Command Default

Cable per-physical-downstream static multicast support is not defined by default.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

## Usage Guidelines

The Cable per-physical-downstream Static Multicast Support feature introduces the concept of a physical IGMP static group, which is an extension of the existing logical IGMP static group. The differences between the two IGMP static groups are:

- A cable bundle logical IGMP static group creates the IGMP static group for the logical IP domain and forwards multicast traffics for the configured multicast group to every slave interface in the same bundle.
- A cable bundle physical IGMP static group creates the IGMP static group on per-physical slave interface basis and will only forwards multicast traffics to only configured slave interfaces.

When an IGMP static group is configured on a master interface, the IGMP static group will perform a check for each slave interface in the multicast group. If the multicast group is configured as a physical static group, then only the corresponding slave interfaces will be added to the cable bundle forwarding table. If the multicast group is configured as a logical static group, then all slave interfaces will be added to the cable bundle forwarding table.



### Note

When all remaining physical static groups are un-configured from the slave interface for a particular multicast group on a particular bundle, the Cisco CMTS router will revert back to the logical static group for that multicast group on that bundle.

### DSG Usage

The **cable igmp static-group** command will only appear in the output of the **show running-configuration** command if it is configured via the CLI. If it is configured by DSG, the **cable igmp static-group** command CLI will remain hidden for a particular multicast group. This is done in order to eliminate any confusion with the current DSG configurations.

**Note**

Any multicast group being used by DSG (or CLI) within the same CMTS, should not be used for CLI (or DSG) configuration.

### Examples

The following example shows the **cable igmp static-group** command on the Cisco CMTS router:

```
Router(config-if)# cable igmp static-group 230.1.1.1
```

The following example shows the **cable igmp static-group** command with the **source** option on the Cisco CMTS router:

```
Router(config-if)# cable igmp static-group 232.1.1.1 source 10.1.1.1
```

### Related Commands

| Command                     | Description                                                |
|-----------------------------|------------------------------------------------------------|
| <b>ip igmp static-group</b> | Configure static group membership entries on an interface. |

# cable init-channel-timeout

To specify the maximum time that a CM can spend performing initial ranging on the upstream channels described in the Registration Response (REG-RSP) and Multipart Registration Response (REG-RSP-MP) messages, use the **cable init-channel-timeout** command in cable interface configuration mode. To disable this configuration, use the **no** form of this command.

**cable init-channel-timeout** *value*

**no cable init-channel-timeout** *value*

|                           |              |                                                                                                   |
|---------------------------|--------------|---------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>value</i> | Channel timeout value in seconds. Valid range is from 10 to 180 seconds. The default value is 60. |
|---------------------------|--------------|---------------------------------------------------------------------------------------------------|

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

|                        |                |                                                               |
|------------------------|----------------|---------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                           |
|                        | 12.2(33)SCC    | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

|                 |                                                                                                                                                  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to specify the channel timeout value on a cable interface at slot/subslot/port 5/1/0 on a Cisco uBR10012 router: |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# interface cable 5/1/0
Router(config-if)# cable init-channel-timeout 90
```

# cable insertion-interval

To configure the interval between consecutive initial ranging slots on an upstream, use the **cable insertion-interval** interface configuration command. To configure the automatic setting and ignore any minimum or maximum time settings, use the **no** form of this command.

**cable insertion-interval** {**fixed-intrvl** | **automatic** [*min-intrvl*] [*max-intrvl*] }

**no cable insertion-interval**

## Syntax Description

|                     |                                                                                                                                                                 |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>fixed-intrvl</b> | Fixed interval between initial ranging slots in milliseconds. The valid range is 100 to 2000 milliseconds.                                                      |
| <b>automatic</b>    | Causes the Cisco CMTS MAC scheduler for each upstream CM to vary the initial ranging times available to new CMs joining the network.                            |
| <i>min-intrvl</i>   | (Optional) Minimum value in milliseconds between the initial ranging slots on the upstream. The valid range is 20 to 120, with a default of 60 milliseconds.    |
| <i>max-intrvl</i>   | (Optional) Maximum value in milliseconds between the initial ranging slots on the upstream. The valid range is 240 to 1800, with a default of 480 milliseconds. |

## Command Default

Automatic (dynamically varying the frequency of initial ranging upstream slots between 60 milliseconds and 480 milliseconds)

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 11.NA       | This command was introduced.                                                                                       |
| 12.1 T      | This command was modified.                                                                                         |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

Use this command to specify the minimum and maximum duration between initial ranging opportunities that appear in MAP messages sent by the Cisco CMTS router. MAP messages define the precise time intervals during which CMs can send.

The default insertion interval setting (**automatic**) configures the Cisco CMTS router to optimize the initial ranging times available to new CMs that attempt to join the network. The optimization algorithm automatically varies the initial ranging times between 60 and 480 milliseconds, depending on the number of CMs attempting to come online.

Use the **cable insertion-interval automatic** command to bring a large number of CMs online quickly (for example, after a major power failure). After the CMs have come online, you can override the **automatic** keyword by giving this command again and specifying a specific insertion interval.

---

**Examples**

The following example shows the default configuration, which is to specify automatic insertion intervals, using the default initial ranging intervals:

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable insertion-interval automatic
```

The following example shows how to set the minimum insertion interval to 100 ms:

```
Router# configure terminal
Router(config)# interface cable 5/1/0
Router(config-if)# cable insertion-interval 100
```

---

**Related Commands**

| Command                             | Description                                                            |
|-------------------------------------|------------------------------------------------------------------------|
| <b>cable upstream data-backoff</b>  | Specifies automatic or fixed start and stop values for data backoff.   |
| <b>cable upstream range-backoff</b> | Specifies automatic or configured initial ranging backoff calculation. |

# cable intercept

To allow the Cisco CMTS router to forward all traffic to and from a particular CPE to a data collector located at particular User Datagram Protocol (UDP) port, use the **cable intercept** command in cable interface configuration mode. To deactivate this function, use the **no** form of this command.

**cable intercept** *mac-address ip-address udp-port*

**no cable intercept** *mac-address*

## Syntax Description

|                    |                                                                                                                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>mac-address</i> | Specifies the MAC address to be intercepted.<br><br>For Cisco uBR10012 router, a maximum of 4095 MAC addresses can be configured. For Cisco uBR7200 series router, a maximum of 10 MAC addresses per interface can be configured. |
| <i>ip-address</i>  | Specifies the IP address for the destination data collector.                                                                                                                                                                      |
| <i>udp-port</i>    | Specifies the destination UDP port number for the intercept stream at the data collector. Valid range is 0 to 65535.                                                                                                              |

## Command Default

Disabled

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.0(5)T1   | This command was introduced.                                                                                       |
| 12.0(6)SC   | This command was introduced on the 12.0 SC train.                                                                  |
| 12.1(2)EC   | This command was introduced on 12.1 EC train.                                                                      |
| 12.1(11b)EC | Support was added to allow the data collector to be more than two hops from the Cisco CMTS router.                 |
| 12.2(4)BC1  | This command was integrated into Cisco IOS Release 12.2(4)BC1.                                                     |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCC | This command was modified. The command is now configured under bundle interface.                                   |

## Usage Guidelines

When this command is activated, the Cisco CMTS router examines each packet for the desired MAC address; when a matching MAC address is found (for either the origination or destination endpoint), a copy of the packet is encapsulated into a UDP packet, which is then sent to the specified server at the given IP address and port.

**Note**

The data collecting system at the *ip-address* on the *udp-port* must be configured to listen for and capture the necessary data stream. An IP route to the specified IP address must exist, and IP connectivity to that device must be present for the traffic to be captured. Before Cisco IOS Release 12.1(11b)EC, the data collecting system must be within two routing hops of the Cisco CMTS.

For Cisco uBR10012 router, a maximum of 4095 MAC intercepts can be configured. This includes the MAC intercepts configured using the **cable intercept** command, and other lawful intercept features (such as Service Independent Intercept [SII]). The bandwidth used by each MAC intercept is also a deciding factor for the number of MAC intercepts that can be configured. High bandwidth usage by a MAC intercept might reduce the number of MAC intercepts that can be configured.

This command is originally designed to comply with the United States Federal Communications Assistance for Law Enforcement Act (CALEA) and other law enforcement wiretap requirements for voice communications. For additional information, see the *PacketCable Electronic Surveillance Specification*, which is available at the following URL at the PacketCable web site:  
<http://www.packetcable.com>.

**Note**

For lawful intercept, it is recommended to use SII (through SNMPv3) instead of the **cable intercept** command.

**Note**

Starting from Cisco IOS Release 12.2(33)SCC, the **cable intercept** command is configured under bundle interface.

**Examples**

The following commands specify that a copy of all traffic for the CPE with the MAC address of 0080.fcaa.aabb should be forwarded to the data collector that is listening at UDP port 512 at the IP address of 10.12.13.8. The **show interface cable intercept** command displays which intercepts are currently active.

```
Router# configure terminal
Router(config) interface cable 6/0
Router(config-if)# cable intercept 0080.fcaa.aabb 10.12.13.8 512
Router(config-if)# exit
Router(config)# exit
Router# show interface cable 6/0 intercept
```

| MAC Address    | IP Address | UDP Port |
|----------------|------------|----------|
| 0080.fcaa.aabb | 3.12.13.8  | 512      |

The following example shows the behavior of the **cable intercept** command that is configured under bundle interface. The **show running interface** command displays which intercepts are currently active.

```
Router# configure terminal
Router(config) interface bundle 10
Router(config-if)# cable intercept 0080.fcaa.aabb 10.12.13.8 512
Router(config-if)# exit
Router(config)# exit
Router# show running interface bundle 10 | i intercept
cable intercept 0080.fcaa.aabb 10.12.13.8 512
```



| Related Commands | Command                               | Description                                                                                    |
|------------------|---------------------------------------|------------------------------------------------------------------------------------------------|
|                  | <b>cable monitor</b>                  | Enables the forwarding of selected packets on the cable interface to an external LAN analyzer. |
|                  | <b>show interface cable intercept</b> | Displays the CMs for which cable intercept is currently active.                                |

# cable ip-init

To configure the IP provisioning mode supported by the cable interface on a Cisco CMTS router, use the **cable ip-init** command in interface or subinterface configuration mode. To remove the IP provisioning configuration, use the **no** form of this command.

**cable ip-init** { **apm** | **dual-stack** | **ipv4** | **ipv6** }

**no cable ip-init** { **apm** | **dual-stack** | **ipv4** | **ipv6** }

## Syntax Description

|                   |                                                                          |
|-------------------|--------------------------------------------------------------------------|
| <b>apm</b>        | Configures the interface to support Alternative Provisioning Mode (APM). |
| <b>dual-stack</b> | Configures the interface to support both IPv4 and IPv6 addressing.       |
| <b>ipv4</b>       | Configures the interface to support IPv4 address only.                   |
| <b>ipv6</b>       | Configures the interface to support IPv6 address only.                   |

## Command Default

None

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                                                 |
|-------------|--------------------------------------------------------------|
| 12.2(33)SCA | This command was introduced.                                 |
| 12.2(33)SCC | This command was modified. The <b>apm</b> keyword was added. |

## Usage Guidelines

The **cable ip-init** command configures the cable interface for the IP addressing mode that it supports. This information is included in the IP initialization parameters of the MAC Domain Descriptor (MDD) message.

## Examples

The following example shows how to configure a cable interface on a Cisco CMTS router to support both IPv4 and IPv6 addressing:

```
interface cable 5/0/1
 cable ip-init dual-stack
```

# cable ip-broadcast-echo

To activate upstream IP broadcast echo so that the Cisco CMTS router can echo broadcast packets, use the **cable ip-broadcast-echo** command in cable interface or subinterface configuration mode. To disable the upstream IP broadcast echo, use the **no** form of this command.

**cable ip-broadcast-echo**

**no cable ip-broadcast-echo**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Disabled

## Command Modes

Cable interface and subinterface configuration (config-if)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 11.3 XA     | This command was introduced.                                                                                       |
| 12.1(3a) EC | The subinterface support was added.                                                                                |
| 12.1(5)EC   | Support was added for the Cisco uBR7100 series routers.                                                            |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

By default, broadcast IP packets that arrive on the upstream at the Cisco CMTS router are not forwarded on the downstream ports so that they would be delivered to the other CMs and CPE devices. This behavior prevents broadcast storms in which such packets are repeatedly looped through the network.

The **cable ip-broadcast-echo command** changes this behavior by forwarding such packets on the appropriate downstream ports, so that the packet is received by all CMs and CPE devices on that segment of the network. This allows the cable network to behave more like a standard Ethernet network, and support direct peer-to-peer communications using IP broadcasts.



### Note

This command should not be used in a typical service provider network.

## Examples

The following example shows how to activate IP broadcast echo in the cable interface configuration mode:

```
Router(config-if) # cable ip-broadcast-echo
```

The following example shows how to activate IP broadcast echo in the cable subinterface configuration mode:

```
Router(config)# interface cable 6/0.1
Router(config-subif)# cable ip-broadcast-echo
```

**Related Commands**

| Command                        | Description                                                                  |
|--------------------------------|------------------------------------------------------------------------------|
| <b>cable ip-multicast-echo</b> | Enables IP multicast echo so that the Cisco CMTS can echo multicast packets. |

# cable ip-multicast-echo

To enable IP multicast echo so that the Cisco CMTS can echo multicast packets, use the **cable ip-multicast-echo** command in cable interface configuration mode. To disable IP multicast echo, use the **no** form of this command.

**cable ip-multicast-echo**

**no cable ip-multicast-echo**

## Syntax Description

This command has no arguments or keywords.

## Command Default

IP multicast echo is disabled by default.

## Command Modes

Cable interface configuration (config-if)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 11.3 XA     | This command was introduced for Cisco uBR7200 series routers.                                                      |
| 12.1(3a) EC | The subinterface support was added.                                                                                |
| 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                |
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router.                                                                   |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCB | The command default is changed to disabled in Cisco IOS Release 12.2(33)SCB and later.                             |

## Usage Guidelines

By default, multicast IP packets that arrive on the upstream at the Cisco CMTS are forwarded on the appropriate downstream ports so that they are delivered to the other CMs and CPE devices on that segment of the network. This allows the cable network to behave like a standard Ethernet network in terms of its handling of multicast IP traffic.

This behavior might not be appropriate for certain applications or networks, so the **no cable ip-multicast-echo command** changes this behavior by preventing the forwarding of multicast packets. Disabling multicast traffic can prevent some types of broadcast storms in which such packets are repeatedly looped through the network.

To verify if IP multicast echo has been activated or deactivated, enter the **show running-config** command and look for the cable interface configuration information.

If IP multicast echo is enabled, it appears in this output of the **show running-config** command.

If IP multicast echo is disabled, it is not displayed in the output **show running-config** command.

If you are having trouble, make sure that you have entered the correct slot and port numbers when you entered cable bundle interface configuration mode.

**Note**

On the Cisco uBR10012 router, input access lists are not applied to the multicast traffic that is echoed on each downstream. To control the echoed multicast traffic, you therefore need to configure an output access list and apply it to each downstream interface.

**Examples**

The following example shows how to disable IP multicast echo in the bundle interface configuration mode:

```
Router(config-if)# no cable ip-multicast-echo
```

**Related Commands**

| Command                        | Description                                                                           |
|--------------------------------|---------------------------------------------------------------------------------------|
| <b>cable ip-broadcast-echo</b> | Enables upstream IP broadcast echo so that the Cisco CMTS can echo broadcast packets. |

# cable ipc-stats

To enable the Cable IPC Statistics Collection tool on a Cisco CMTS router, use the **cable ipc-stats** command in global configuration mode. To disable this configuration, use the **no** form of this command.

**cable ipc-stats**

**no cable ipc-stats**

**Syntax Description** This command has no arguments or keywords.

**Command Default** The Cable IPC Statistics Collection tool is not enabled by default.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                  |
|-----------------|-------------|---------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Usage Guidelines** The Cable IPC Statistics Collection tool provides debugging information about all IPC messages. We recommend that you enable this tool only when it is necessary as the tool consumes considerable amount of CPU memory while running on a Cisco CMTS router.

The **cable ipc-stats** command is synchronized on all cable interface line cards from the active RP. You do not have to use this command on cable interface line cards separately.

**Examples** The following example shows how to enable the Cable IPC Statistics Collection tool on a Cisco CMTS router:

```
Router# configure terminal
Router(config)# cable ipc-stats
```

| Related Commands | Command                      | Description                                                                          |
|------------------|------------------------------|--------------------------------------------------------------------------------------|
|                  | <b>clear cable ipc-stats</b> | Clears the active database and resets IPC statistics in the active database to zero. |
|                  | <b>show cable ipc-stats</b>  | Displays statistics of all the IPC messages on a Cisco CMTS router.                  |

## cable ipv6 source-verify

To enable source verification of IPv6 packets received by a cable interface upstream on a Cisco CMTS router, use the **cable ipv6 source-verify** command in bundle interface or subinterface configuration mode. To disable IPv6 source verification, use the **no** form of this command.

```
cable ipv6 source-verify [dhcp [server ip-address] | leasequery-filter upstream threshold
interval | leasetimer value]
```

```
no cable ipv6 source-verify
```

| Syntax Description       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dhcp</b>              | (Optional) Verifies IP address with the DHCPv6 server. <ul style="list-style-type: none"> <li><b>server</b>—Enables the Leasequery server to send the DHCPv6 Leasequeries.</li> <li><b>ip-address</b>—IPv6 address of the Leasequery server.</li> </ul>                                                                                                                                                                                                                    |
| <b>leasequery-filter</b> | (Optional) Filters the IPv6 Leasequery requests. <ul style="list-style-type: none"> <li><b>upstream</b>—Indicates that the Leasequery requests are sent on cable upstream interfaces.</li> <li><b>threshold</b>—Maximum number of DHCP Leasequeries allowed per SID for each interval period. The valid range is from 0 to 55.</li> <li><b>interval</b>—Time period, in seconds, when Leasequeries should be monitored. The valid range is from 1 to 5 seconds.</li> </ul> |
| <b>leasetimer</b>        | (Optional) Specifies the time, in minutes, when the router should check its internal CPE database for IP addresses whose lease times has expired. <ul style="list-style-type: none"> <li><b>value</b>—Lease time value. The valid range is from 1 to 240 minutes, with a default of 60 minutes.</li> </ul>                                                                                                                                                                 |

|                        |                                       |
|------------------------|---------------------------------------|
| <b>Command Default</b> | IPv6 source verification is disabled. |
|------------------------|---------------------------------------|

|                      |                                                                                                 |
|----------------------|-------------------------------------------------------------------------------------------------|
| <b>Command Modes</b> | Bundle interface configuration (config-if),<br>Bundle subinterface configuration (config-subif) |
|----------------------|-------------------------------------------------------------------------------------------------|

| Command History | Release      | Modification                                                                                                                                                                                                                       |
|-----------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCA  | This command was introduced.                                                                                                                                                                                                       |
|                 | 12.2(33)SCF1 | This command was modified. The <b>dhcp</b> keyword was added to verify IPv6 address with the DHCPv6 server. The <b>leasequery-filter</b> and <b>leasetimer</b> keywords were added to further filter the IPv6 Leasequery requests. |



## Usage Guidelines

The IPv6 source verification feature is enabled on a cable bundle interface or subinterface.

When you enable IPv6 source verification on the Cisco CMTS bundle interface, the source verification routine is run to verify the MAC-SID-IP binding of the packet. If the source verification succeeds, the packet is forwarded. If the verification fails, then the packet is dropped.

When a cable modem (CM) is operating as a bridged modem device, then the Cisco CMTS router verifies the entire IPv6 address for that CM and the CPEs behind that CM.

When a CM is operating as a router modem device, then the Cisco CMTS router only verifies the network prefix for that CM and the CPEs behind that CM. To be successful, this means that all cable modem routers must have different prefixes assigned to them.

The **cable ipv6 source-verify** command only controls the source verification of IPv6 packets. For IPv4-based source verification, you must use the **cable source-verify** command, which also supports different options.



### Note

On the Cisco uBR10012 router in Cisco IOS Release 12.2(33)SCA, source verification of IPv6 packets occurs only on packets in the process-switched path of the route processor (RP).

### Using the dhcp Option

If the **dhcp** option is used, the Cisco CMTS sends a DHCPv6 Leasequery message to the DHCP server to verify the IP address. If a valid response is received from the DHCP server, the Cisco CMTS updates its database with the new CPE device and allows future traffic through. If the DHCP server does not return a successful response, all traffic from the CPE is dropped.

If you are using the **dhcp** option, you have the option to specify an alternate DHCP server using its IP address. The **dhcp** option supports source verification from multiple dhcp servers.

For single dhcp server, use the command **cable ipv6 source-verify dhcp [server ipv6-address]** command. For multipledhcp servers use the command **cable ipv6 source-verify dhcp** command.

### Using the leasetimer Option

The **leasetimer** option adds another level of verification by activating a timer that periodically examines the lease times for the IP addresses for known CPE devices. If the Cisco CMTS discovers that the DHCP lease for a CPE device has expired, it removes that IP address from its database, preventing the CPE device from communicating until it makes another DHCP request. This prevents users from treating DHCP-assigned addresses as static addresses, as well as from using IP addresses that were previously assigned to other devices.

The **leasetimer** option takes effect only when the **dhcp** option is also used on an interface. Also, this option is supported only on the primary bundle interface and cannot be configured on subinterfaces. Configuring it for a primary bundle interface automatically applies it to all subinterfaces.

### Using the leasequery-filter Option

To prevent a large volume of Leasequery requests on a cable interface, use the **cable ipv6 source-verify leasequery-filter** command. After configuring this command, the Cisco CMTS allows only the configured number of DHCPv6 Leasequery requests within the specified interval time period.

For example, the **cable ipv6 source-verify leasequery-filter 5 10** command configures the Cisco CMTS so that the Cisco CMTS allows a maximum of five DHCPv6 Leasequery requests every 10 seconds for each SID.

**Examples**

The following example shows how to enable IPv6 source verification on a Cisco CMTS router bundle interface by first configuring cable ipv6 source-verify at the bundle interface:

```
interface bundle 1
 cable ipv6 source-verify
```

After you configure the bundle interface, associate the bundle at the cable interface:

```
interface cable 6/0/2
 cable bundle 1
```

The following example shows how to configure the Cisco CMTS router to send DHCPv6 Leasequeries to verify unknown source IP addresses in upstream data packets. Both **cable ipv6 source-verify dhcp** and **no cable nd** commands must be configured on the Cisco CMTS bundle before the Cisco CMTS will issue any DHCPv6 Leasequery to recover an unknown IPv6 CPE to the Cisco CMTS.

```
configure terminal
 interface bundle 1
 cable ipv6 source-verify dhcp
 no cable nd
```

The following example shows how to configure the leasetimer option so that the Cisco CMTS checks the IP addresses in the CPE database for that particular interface for expired lease time:

```
configure terminal
 interface bundle 1
 cable ipv6 source-verify dhcp
 cable ipv6 source-verify leasetimer 120
```

The following example shows how to configure the Cisco CMTS router so that it allows a maximum of five DHCP Leasequery requests per SID over each 2-second interval on a particular cable interface.

```
configure terminal
 interface bundle 1
 cable ipv6 source-verify dhcp
 cable ipv6 source-verify leasequery-filter 5 2
```

**Associated Features**

The **cable ipv6 source-verify** command is used to configure the following feature:

- [Cable DHCP Leasequery](#)

**Related Commands**

| Command                                                      | Description                                                                    |
|--------------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>cable source-verify</b>                                   | Enables verification of IPv4 addresses for CMs and CPE devices on an upstream. |
| <b>cable ipv6 source-verify leasequery-filter downstream</b> | Enables the Leasequery filter in the CMTS downstream for IPv6 packets.         |

# cable ipv6 source-verify leasequery-filter downstream

To enable the Leasequery filter on the Cisco CMTS downstream for IPv6 packets, use the **cable ipv6 source-verify leasequery-filter downstream** command in global configuration mode. To disable the Leasequery filter on the Cisco CMTS downstream, use the **no** form of this command.

**cable ipv6 source-verify leasequery-filter downstream** *threshold interval*

**no cable ipv6 source-verify leasequery-filter downstream**

|                    |                   |                                                                                                                                                                                                                                                                                                                            |
|--------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>downstream</b> | Filters the IPv6 Leasequery requests on the Cisco CMTS downstream.                                                                                                                                                                                                                                                         |
|                    |                   | <ul style="list-style-type: none"><li><i>threshold</i>—Maximum number of DHCP Leasequeries allowed for unknown SIDs for each interval period. The valid range is from 0 to 255.</li><li><i>interval</i>—Time period, in seconds, when Leasequeries should be monitored. The valid range is from 1 to 10 seconds.</li></ul> |

|                 |                                                      |
|-----------------|------------------------------------------------------|
| Command Default | IPv6 source verification for downstream is disabled. |
|-----------------|------------------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.2(33)SCF1 | This command was introduced. |

|                  |                                                                                                                                                             |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | Use the <b>cable ipv6 source-verify leasequery-filter downstream</b> command to enable the Leasequery filter on the Cisco CMTS downstream for IPv6 packets. |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                             |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows how to enable the Leasequery filter on the CMTS downstream for IPv6 packets on all downstream cable interfaces. |
|          | <pre>Router# configure terminal Router(config)# cable ipv6 source-verify leasequery-filter downstream 10 5</pre>                            |

|                     |                                                                                                                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------|
| Associated Features | The <b>cable ipv6 source-verify leasequery-filter downstream</b> command is used to configure the following feature: |
|                     | <ul style="list-style-type: none"><li><a href="#">Cable DHCP Leasequery</a></li></ul>                                |

|                  |
|------------------|
| Related Commands |
|------------------|

| Command                             | Description                                                                                                |
|-------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>cable ipv6<br/>source-verify</b> | Enables source verification of IPv6 packets received by a cable interface upstream on a Cisco CMTS router. |







# Cable Commands: cable l

Revised: August 12, 2013, OL-15510-17

## New Commands

| Command                                                    | Cisco IOS Software Release |
|------------------------------------------------------------|----------------------------|
| <b>cable l2-vpn-service default-nsi</b>                    | 12.2(33)SCA                |
| <b>cable load-balance docsis-policy</b>                    | 12.2(33)SCB                |
| <b>cable load-balance rule</b>                             | 12.2(33)SCB                |
| <b>cable l2-vpn</b>                                        | 12.2(33)SCC                |
| <b>cable l2-vpn-service xconnect</b>                       | 12.2(33)SCC                |
| <b>cable load-balance d30-ggrp-default</b>                 | 12.2(33)SCC                |
| <b>cable load-balance docsis-enable</b>                    | 12.2(33)SCC                |
| <b>cable load-balance docsis-group</b>                     | 12.2(33)SCC                |
| <b>cable load-balance modem max-failures</b>               | 12.2(33)SCC                |
| <b>cable load-balance restrict modem</b>                   | 12.2(33)SCC                |
| <b>cable linecard critical-event-poweroff</b>              | 12.2(33)SCE                |
| <b>cable l2-vpn xconnect backup force-switchover</b>       | 12.2(33)SCF                |
| <b>cable linecard auto-rommon-downgrade</b>                | 12.2(33)SCF                |
| <b>cable linecard auto-rommon-upgrade</b>                  | 12.2(33)SCF                |
| <b>cable load-balance docsis30-enable</b>                  | 12.2(33)SCF1               |
| <b>cable logging downstream-index</b>                      | 12.2(33)SCG                |
| <b>cable load-balance d20 GLBG auto-generate</b>           | 12.2(33)SCH                |
| <b>cable load-balance method-utilization min-threshold</b> | 12.2(33)SCH                |

## Modified Commands

| Command                                 | Cisco IOS Software Release |
|-----------------------------------------|----------------------------|
| <b>cable load-balance docsis-policy</b> | 12.2(33)SCC                |
| <b>cable load-balance rule</b>          | 12.2(33)SCC                |

| Command                                                                          | Cisco IOS Software Release |
|----------------------------------------------------------------------------------|----------------------------|
| <b>cable load-balance rule</b>                                                   | 12.2(33)SCD5               |
| <b>cable load-balance group</b>                                                  | 12.2(33)SCE4               |
| <b>cable load-balance group</b> (interface)                                      | 12.2(33)SCE4               |
| <b>cable load-balance group interval</b>                                         | 12.2(33)SCE4               |
| <b>cable load-balance group policy ugs</b>                                       | 12.2(33)SCE4               |
| <b>cable load-balance group threshold</b>                                        | 12.2(33)SCE4               |
| <b>cable load-balance group threshold</b><br>(Supporting_Dynamic_Channel_Change) | 12.2(33)SCE4               |
| <b>cable load-balance d30ggrp-default</b>                                        | 12.2(33)SCH                |
| <b>cable load-balance d20ggrp-default</b>                                        | 12.2(33)SCH                |
| <b>cable load-balance exclude</b>                                                | 12.2(33)SCH                |
| <b>cable load-balance docsis30-enable</b>                                        | 12.2(33)SCH1               |

#### Replaced Commands

| Command                                     | Replacement Command                  | Effective Cisco IOS Release |
|---------------------------------------------|--------------------------------------|-----------------------------|
| <b>cable l2-vpn-service<br/>default-nsi</b> | <b>cable l2-vpn-service xconnect</b> | 12.2(33)SCC                 |



# cable l2vpn

To enable the Ethernet Layer 2 Virtual Private Network (L2VPN) service and enter L2VPN configuration mode, use the **cable l2vpn** command in global configuration mode. To disable this configuration, use the **no** form of this command.

**cable l2vpn** *mac-address* [*customer-name*]

**no cable l2vpn** *mac-address* [*customer-name*]

|                    |                      |                           |
|--------------------|----------------------|---------------------------|
| Syntax Description | <i>mac-address</i>   | MAC address of a CM.      |
|                    | <i>customer-name</i> | (Optional) Customer name. |

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

|                 |             |                                                               |
|-----------------|-------------|---------------------------------------------------------------|
| Command History | Release     | Modification                                                  |
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Examples** The following example shows how to enable the Ethernet L2VPN service and enter L2VPN configuration mode on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# cable l2vpn 0000.396e.6a68 customer1
Router(config-l2vpn)#
```

|                  |                         |                                                                   |
|------------------|-------------------------|-------------------------------------------------------------------|
| Related Commands | Command                 | Description                                                       |
|                  | <b>service instance</b> | Specifies an Ethernet service instance for a particular customer. |

# cable l2-vpn-service atm-vc

To enable the use of Layer 2 tunnels for the Customer Premises Equipment (CPE) traffic that is behind cable modems so that individual CPE traffic can be routed to a particular permanent virtual connection (PVC) on an Asynchronous Transfer Mode (ATM) interface, use the **cable l2-vpn-service atm-vc** command in global configuration mode. To disable the use of Layer 2 tunneling, use the **no** form of this command.

**cable l2-vpn-service atm-vc**

**no cable l2-vpn-service atm-vc**

**Syntax Description** This command has no arguments or keywords.

**Command Default** The use of Layer 2 tunneling for ATM PVC mapping is disabled.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                                           |
|-----------------|-------------|----------------------------------------------------------------------------------------|
|                 | 12.2(11)BC3 | This command was introduced for Cisco uBR7100 series and Cisco uBR7200 series routers. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                             |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                        |

**Usage Guidelines** This command enables the use of Layer 2 tunnels on all cable and ATM interfaces in the router—which in turn allows you to map cable modems, on the basis of their hardware (MAC) addresses, to particular PVCs on an ATM interface—using the **cable vc-map** command.

**Examples** The following example shows how to enable the use of Layer 2 tunnels on a router so that cable modems can be mapped to particular PVCs on an ATM interface:

```
Router# config terminal
Router(config)# cable l2-vpn-service atm-vc
```

| Related Commands | Command                         | Description                                                                                                  |
|------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------|
|                  | <b>cable vc-map</b>             | Maps a cable modem to a particular PVC on an ATM interface.                                                  |
|                  | <b>debug cable l2-vpn</b>       | Displays debugging messages for the Layer 2 mapping of cable modems to a particular PVC on an ATM interface. |
|                  | <b>show cable l2-vpn vc-map</b> | Displays the mapping of one or all cable modems to PVCs on the ATM interfaces.                               |

# cable l2-vpn-service default-nsi

**Note**

Effective with Cisco IOS Release 12.2(33)SCC, the **cable l2-vpn-service default-nsi** command is replaced by the **cable l2-vpn-service xconnect** command. See the **cable l2-vpn-service xconnect** command for more information.

To configure an Ethernet Network System Interface for Layer 2 VPN support over cable, use the **cable l2-vpn-service default-nsi** command in global configuration mode. To remove the interface, use the **no** form of this command.

**cable l2-vpn-service default-nsi** *type number*

**no cable l2-vpn-service default-nsi** *type number*

**Syntax Description**

|               |                                                                                                                                                               |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>type</i>   | Interface type. See the Usage Guidelines section for supported types.                                                                                         |
| <i>number</i> | Interface or subinterface number. For more information about the numbering syntax for your networking device, use the question mark (?) online help function. |

**Command Default**

No NSI interface is configured.

**Command Modes**

Global configuration

**Command History**

| Release     | Modification                                                                   |
|-------------|--------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was introduced.                                                   |
| 12.2(33)SCC | This command was replaced by the <b>cable l2-vpn-service xconnect</b> command. |

**Usage Guidelines**

The Cisco CMTS routers only support the configuration of a single L2VPN NSI per CMTS.

This command supports the following interface types:

- Cisco uBR100012 Universal Broadband Router—Gigabit Ethernet.
- Cisco uBR7246VXR Universal Broadband Router—Fast Ethernet or Gigabit Ethernet

**Examples**

The following example configures the Gigabit Ethernet line card located in slot 4/0/0 as an NSI for L2VPN using global configuration mode:

```
cable l2-vpn-service default-nsi GigabitEthernet4/0/0
```

**Related Commands**

| Command                               | Description                                                                                               |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>show cable l2-vpn dot1q-vc-map</b> | Displays the mapping of one or all cable modems to IEEE 802.1Q VLANs on the router's Ethernet interfaces. |

# cable l2-vpn-service dot1q

To enable the use of Layer 2 tunnels so that traffic for individual cable modems can be routed over a particular Virtual Local Area Network (VLAN), use the `cable l2-vpn-service dot1q` command in global configuration mode. To disable the use of Layer 2 tunneling, use the **no** form of this command.

**cable l2-vpn-service dot1q**

**no cable l2-vpn-service dot1q**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | Layer 2 tunneling is disabled. |
|------------------------|--------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

|                        |                |                                                                               |
|------------------------|----------------|-------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                           |
|                        | 12.2(15)BC2    | This command was introduced for Cisco uBR7246VXR universal broadband routers. |

|                         |                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command enables the use of Layer 2 tunnels, using IEEE 802.1Q VLAN tagging, on all cable interfaces in the router. This in turn allows you to map traffic to and from cable modems, on the basis of the modems' hardware (MAC) addresses, to a particular VLAN on a particular WAN interface, using the <b>cable dot1q-vc-map</b> command. |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                     |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable the use of IEEE 802.1Q Layer 2 tunnels on a router so that cable modems can be mapped to particular VLAN: |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# config terminal
Router(config)# cable l2-vpn-service dot1q
Router(config)#
```

The following example shows how to disable the use of IEEE 802.1Q Layer 2 tunnels on a router. All mapping of cable modems to IEEE 802.1Q VLANs is halted (but any other Layer 2 mapping, such as the mapping of cable modems to ATM PVCs, is unaffected).

```
Router# config terminal
Router(config)# no cable l2-vpn-service dot1q
Router(config)#
```

| Related Commands | Command                               | Description                                                                                                                             |
|------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dot1q-vc-map</b>             | Maps a cable modem to a particular Virtual Local Area Network (VLAN) on a local outbound Ethernet interface.                            |
|                  | <b>debug cable l2-vpn</b>             | Displays debugging messages for the Layer 2 mapping of cable modems to particular PVCs or VLANs.                                        |
|                  | <b>show cable l2-vpn dot1q-vc-map</b> | Displays the mapping of one or all cable modems to IEEE 802.1Q Virtual Local Area Networks (VLANs) on the router's Ethernet interfaces. |

# cable l2-vpn-service xconnect

To enable Multiprotocol Label Switching (MPLS) tunnel traffic on the network side interface to support configuration of MPLS pseudowires for L2VPN service, use the **cable l2-vpn-service xconnect** command in global configuration mode. To disable this configuration, use the **no** form of this command.

**cable l2-vpn-service xconnect nsi {dot1q | mpls}**

**no cable l2-vpn-service xconnect nsi {dot1q | mpls}**

## Syntax Description

|              |                                                                               |
|--------------|-------------------------------------------------------------------------------|
| <b>nsi</b>   | Specifies the network side interface (NSI).                                   |
| <b>dot1q</b> | Specifies the usage of DOT1Q tunneling on the NSI for Ethernet L2VPN traffic. |
| <b>mpls</b>  | Specifies the usage of MPLS tunneling on the NSI for Ethernet L2VPN traffic.  |

## Command Default

None

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                  |
|-------------|---------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

## Usage Guidelines

You must enable MPLS tunnel traffic on the network side interface using the **cable l2-vpn-service xconnect** command before provisioning MPLS pseudowires.

## Examples

The following example shows how to enable the use of Layer 2 tunnels based on an AToM pseudowire on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# cable l2-vpn-service xconnect nsi mpls
```

## Related Commands

| Command            | Description                                                   |
|--------------------|---------------------------------------------------------------|
| <b>cable l2vpn</b> | Enables the Ethernet Layer 2 Virtual Private Network (L2VPN). |

# cable l2-vpn xconnect backup force-switchover

To manually force a switchover to a pseudowire peer, use the **xconnect backup force-switchover** command in privileged EXEC mode.

**cable l2-vpn xconnect backup force-switchover peer** *ip-address vcid*

## Syntax Description

|                                    |                                                                                                                                                                                                                                                                                    |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>peer</b> <i>ip-address vcid</i> | Specifies the IP address and virtual circuit (VC) ID of the pseudowire to be used for the switchover. <ul style="list-style-type: none"><li>• <i>ip-address</i>—IP address of the peer pseudowire.</li><li>• <i>vcid</i>—Virtual circuit address of the peer pseudowire.</li></ul> |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

The pseudowire will not be changed.

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCF | This command was introduced. |

## Usage Guidelines

You can perform a switchover only to an available member in the redundancy group. That is, if the member being specified in the **cable l2vpn xconnect backup force-switchover** command is not available, the command will be rejected.

## Examples

The following example shows how to manually switchover to a peer router.

```
Router# cable l2vpn xconnect backup force-switchover peer 10.10.1.1 123
```

## Related Commands

| Command                          | Description                                                                                                                                      |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>backup delay</b>              | Specifies how long a backup pseudowire VC should wait before taking over after the primary pseudowire VC goes down.                              |
| <b>backup peer</b>               | Configures a redundant peer for a pseudowire VC.                                                                                                 |
| <b>show cable l2vpn xconnect</b> | Displays information about the mapping between a Multiprotocol Label Switching (MPLS) pseudowire and its VCs.                                    |
| <b>show mpls l2transport vc</b>  | Displays information about Any Transport over MPLS (AToM) VCs and static pseudowires that have been enabled to route Layer 2 packets on a router |
| <b>show xconnect all</b>         | Displays information about xconnect attachment circuits and pseudowires.                                                                         |



# cable linecard auto-rommon-downgrade

To enable the automatic ROM-Monitor (ROMMON) image downgrade on cable interface line cards, use the **cable linecard auto-rommon-downgrade** command in global configuration mode. To disable automatic ROMMON image downgrade on cable interface line cards, use the **no** form of this command.

**cable linecard auto-rommon-downgrade**

**no cable linecard auto-rommon-downgrade**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The automatic ROMMON image downgrade is disabled.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCF | This command was introduced. |

## Usage Guidelines

The automatic ROMMON downgrade is disabled by default on all line cards, and we recommend that you do not change this default behavior.

## Examples

The following example shows how to enable automatic ROMMON downgrade on all cable interface line cards:

```
Router(config)# cable linecard auto-rommon-downgrade
```

The following example shows how to disable automatic ROMMON downgrade on all cable interface line cards:

```
Router(config)# no cable linecard auto-rommon-downgrade
```

## Related Commands

| Command                                   | Description                                                                       |
|-------------------------------------------|-----------------------------------------------------------------------------------|
| <b>cable linecard auto-rommon-upgrade</b> | Enables or disables automatic ROMMON image upgrade on cable interface line cards. |

# cable linecard auto-rommon-upgrade

To enable the automatic ROM-Monitor (ROMMON) image upgrade on cable interface line cards, use the **cable linecard auto-rommon-upgrade** command in global configuration mode. To disable automatic ROMMON upgrade on cable interface line cards, use the **no** form of this command.

```
cable linecard auto-rommon-upgrade

no cable linecard auto-rommon-upgrade
```

| Syntax Description                          | This command has no arguments or keywords.                                                                                                                                                                                                                                                                                                                            |         |              |                                             |                                                                                     |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|---------------------------------------------|-------------------------------------------------------------------------------------|
| Command Default                             | The automatic ROMMON image upgrade is disabled.                                                                                                                                                                                                                                                                                                                       |         |              |                                             |                                                                                     |
| Command Modes                               | Global configuration (config)                                                                                                                                                                                                                                                                                                                                         |         |              |                                             |                                                                                     |
| Command History                             | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>12.2(33)SCF</td><td>This command was introduced.</td></tr></table>                                                                                                                                                                                                                                       | Release | Modification | 12.2(33)SCF                                 | This command was introduced.                                                        |
| Release                                     | Modification                                                                                                                                                                                                                                                                                                                                                          |         |              |                                             |                                                                                     |
| 12.2(33)SCF                                 | This command was introduced.                                                                                                                                                                                                                                                                                                                                          |         |              |                                             |                                                                                     |
| Usage Guidelines                            | To perform automatic ROMMON upgrade on the cable interface line card, use the <b>cable linecard auto-rommon-upgrade</b> command to enable automatic ROMMON image upgrade on the line card and then reload the line card.                                                                                                                                              |         |              |                                             |                                                                                     |
| Examples                                    | <p>The following example shows how to enable automatic ROMMON image upgrade on all cable interface line cards:</p> <pre>Router(config)# cable linecard auto-rommon-upgrade</pre> <p>The following example shows how to disable automatic ROMMON image upgrade on all cable interface line cards:</p> <pre>Router(config)# no cable linecard auto-rommon-upgrade</pre> |         |              |                                             |                                                                                     |
| Related Commands                            | <table><tr><th>Command</th><th>Description</th></tr><tr><td><b>cable linecard auto-rommon-downgrade</b></td><td>Enables or disables automatic ROMMON image downgrade on cable interface line cards.</td></tr></table>                                                                                                                                                 | Command | Description  | <b>cable linecard auto-rommon-downgrade</b> | Enables or disables automatic ROMMON image downgrade on cable interface line cards. |
| Command                                     | Description                                                                                                                                                                                                                                                                                                                                                           |         |              |                                             |                                                                                     |
| <b>cable linecard auto-rommon-downgrade</b> | Enables or disables automatic ROMMON image downgrade on cable interface line cards.                                                                                                                                                                                                                                                                                   |         |              |                                             |                                                                                     |

# cable linecard critical-event-poweroff

To power off the Cisco uBR-MC3GX60V cable interface line card when a device temperature reaches critical threshold values on the CMTS chassis, use the **cable linecard critical-event-poweroff** command in the global configuration mode. To disable this feature, configure the **no** form of the command.

**cable linecard critical-event-poweroff**

**no cable linecard critical-event-poweroff**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Enabled

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

**Usage Guidelines** The PRE will power off the Cisco uBR-MC3GX60V line card if any of the device temperatures on the line card exceeds the critical threshold value. To disable this power off feature, user should configure the **no cable linecard critical-event-poweroff** command and save the configuration.

The temperature thresholds for the devices on the Cisco uBR-MC3GX60V line card are:

```
Router#show environment subslot 6/0
```

```

TEMPERATURE/POWER INFORMATION

```

```
Number of Temperature Sensors : 9
```

```
Sampling frequency : 2 minutes
```

```

Sensor | ID | Current | Minor | Major | Critical | Alarm |
 | | Temperature | | | | Condition |
 | | degC | | | degC | |
 | | | | | | |

```

```
Nickel 10G 1 69 84 89 94 Normal
```

```
Inlet #1 2 47 64 69 74 Normal
```

■ cable linecard critical-event-poweroff

|                      |   |    |    |    |    |        |
|----------------------|---|----|----|----|----|--------|
| CPU                  | 3 | 68 | 86 | 91 | 96 | Normal |
| Raven                | 4 | 46 | 64 | 69 | 74 | Normal |
| Santana              | 5 | 36 | 57 | 62 | 67 | Normal |
| Coldplay             | 6 | 63 | 73 | 78 | 83 | Normal |
| Waxbill              | 7 | 76 | 85 | 90 | 95 | Normal |
| Fauna                | 8 | 70 | 77 | 82 | 87 | Normal |
| Fluorine             | 9 | 62 | 70 | 75 | 80 | Normal |
| -----                |   |    |    |    |    |        |
| Power: 146.216 watts |   |    |    |    |    |        |

Examples

The following example allows the PRE to power off the Cisco uBR-MC3GX60V line card when the device temperature reaches critical threshold values.

Router# **cable linecard critical-event-poweroff**

Related Commands

| Command                 | Description                                                       |
|-------------------------|-------------------------------------------------------------------|
| <b>show environment</b> | Displays temperature, voltage, fan, and power supply information. |

# cable load-balance d20-ggrp-default

To configure a DOCSIS 2.0 general load balancing group (GLBG) that is created automatically for each fiber node (FN) configuration, use the **cable load-balance d20-ggrp-default** command in the global configuration mode. To disable the default values of the DOCSIS 2.0 GLBG, use the **no** form of this command.

**cable load-balance d20-ggrp-default** { **disable** | **init-tech-list** *tech-list* | **docsis-policy** *0-0xffffffff* }

**no cable load-balance d20-ggrp-default disable**

**Note**

The default values that are set using the command apply to DOCSIS 2.0 GLBGs created thereafter. Parameters for existing DOCSIS 2.0 GLBGs do not change.

**Syntax Description**

|                                          |                                                                                 |
|------------------------------------------|---------------------------------------------------------------------------------|
| <b>disable</b>                           | Disables the default values of the DOCSIS 2.0 GLBG that are enabled by default. |
| <b>init-tech-list</b> <i>tech-list</i>   | Sets the default DOCSIS 2.0 GLBG DCC and DBC initialization techniques.         |
| <b>docsis-policy</b> <i>0-0xffffffff</i> | Sets the default DOCSIS 2.0 GLBG load balancing policy.                         |

**Command Default**

**no cable load-balance d20-ggrp-default disable**  
**cable load-balance d20-ggrp-default init-tech-list** *0-4*  
**cable load-balance d20-ggrp-default docsis-policy** *0*

**Command Modes**

Global configuration (config)

**Command History**

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

**Usage Guidelines**

The group parameters in the **cable load-balance d20-ggrp-default** command can be set as default values.

**Examples**

The following is a sample output of the **cable load-balance d20-ggrp-default** command.

```
Router(config)# cable load-balance d20-ggrp-default
Router(config)# cable load-balance d20-ggrp-default disable
Router(config)# cable load-balance d20-ggrp-default docsis-policy 2
Router(config)# cable load-balance d20-ggrp-default init-tech-list 1
```

# cable load-balance d20 GLBG auto-generate

To automatically generate DOCSIS 2.0 general load balancing group (GLBG), use the **cable load-balance d20 GLBG auto-generate** command in privileged EXEC mode.

**cable load-balance d20 GLBG auto-generate** [FN *fnid*] [**renew** | **update**]

|                    |                |                                                                                                                                                                                          |
|--------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | FN <i>fnid</i> | (Optional) Specifies the fiber node ID number for which GLBG is automatically generated. The range is 1 - 256. If <i>fnid</i> is not specified, GLBG is created for all the fiber nodes. |
|                    | <b>renew</b>   | (Optional) Creates DOCSIS 2.0 GLBG for the current FN configuration after removing all DOCSIS load balancing groups with group IDs in the reserved range (0xff00 to 0xffff).             |
|                    | <b>update</b>  | (Optional) Updates DOCSIS 2.0 GLBG with reserved group ID for the current FN configuration. See “Usage Guidelines” section for more information.                                         |

**Command Default** Creates GLBG for all fiber nodes.

**Command Modes** Privileged EXEC (#)

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCH | This command was introduced. |

**Usage Guidelines**

For **renew** keyword, the command executes as follows:

- If the reserved group range (0xff00 to 0xffff) has not been used for any GLBG, a new GLBG is created for the current fiber node.
- If the reserved group range has been used for any GLBG, the existing GLBG is removed and a new GLBG is created for the current fiber node configuration.
- If the reserved group ID has been used for a restricted load balancing group (RLBG), the command fails with a warning message.

For **update** keyword, the command executes as follows:

- If the reserved group range (0xff00 to 0xffff) has not been used for any GLBG, a new GLBG is created for that fiber node.
- If the reserved group range has been used for any GLBG, the GLBG is updated for the current fiber node configuration.
- If the reserved group ID has been used for a restricted load balancing group (RLBG), the command fails with a warning message.

**Associated Features** This command is associated with [Auto-generate DOCSIS 2.0 GLBG](#) feature.

---

**Examples**

The following example shows how to configure the **cable load-balance d20 GLBG auto-generate** command:

```
Router#
Router# cable load-balance d20 GLBG auto-generate FN 3
Router#
```

---

**Related Commands**

| Command                                     | Description                                                                                                                  |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>show cable load-balance docsis-group</b> | Displays real time configurational, statistical, and operational information of the load balancing operations on the router. |

# cable load-balance d30-ggrp-default

To configure a DOCSIS 3.0 general load balancing group (GLBG) that is created automatically for each MD-CM-SG based on the fiber node (FN) configuration, use the **cable load-balance d30-ggrp-default** command in the global configuration mode. To disable the default values of the DOCSIS 3.0 GLBG, use the **no** form of this command.

```
cable load-balance d30-ggrp-default {disable | init-tech-list tech-list | docsis-policy 0-0xffffffff}

no cable load-balance d30-ggrp-default disable
```



Note

The default values that are set using the command apply to DOCSIS 3.0 GLBGs created thereafter. Parameters for existing DOCSIS 3.0 GLBGs do not change.

|                    |                                          |                                                                                 |
|--------------------|------------------------------------------|---------------------------------------------------------------------------------|
| Syntax Description | <b>disable</b>                           | Disables the default values of the DOCSIS 3.0 GLBG that are enabled by default. |
|                    | <b>init-tech-list</b> <i>tech-list</i>   | Sets the default DOCSIS 3.0 GLBG DCC and DBC initialization techniques.         |
|                    | <b>docsis-policy</b> <i>0-0xffffffff</i> | Sets the default DOCSIS 3.0 GLBG load balancing policy.                         |

|                 |                                                                                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command Default | <b>no cable load-balance d30-ggrp-default disable</b><br><b>cable load-balance d30-ggrp-default init-tech-list 0-4</b><br><b>cable load-balance d30-ggrp-default docsis-policy 0</b> |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCC    | This command was introduced. |

|                  |                                                                                                              |
|------------------|--------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The group parameters in the <b>cable load-balance d30-ggrp-default</b> command can be set as default values. |
|------------------|--------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                                                                                                                                                        |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following is a sample output of the <b>cable load-balance d30-ggrp-default</b> command.</p> <pre>Router(config)# cable load-balance d30-ggrp-default Router(config)# cable load-balance d30-ggrp-default disable Router(config)# cable load-balance d30-ggrp-default docsis-policy 2 Router(config)# cable load-balance d30-ggrp-default init-tech-list 1</pre> |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



# cable load-balance docsis-enable

To enable or disable DOCSIS load balancing on the CMTS, use the **cable load-balance docsis-enable** command in the global configuration mode. To disable DOCSIS load balancing, use the **no** form of this command.

**cable load-balance docsis-enable**

**no cable load-balance docsis-enable**

## Syntax Description

This command has no arguments or keywords.

## Command Default

By default, the command is disabled on all the routers.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

When a cable modem is assigned to a Restricted Load Balancing Group (RLBG), and registers on a channel pair that is not associated with the assigned Load Balancing Group (LBG), the Cisco CMTS moves the cable modem to an appropriate set of channels in the assigned LBG. When you use the **no cable load-balance docsis-enable** command, the cable modem does not participate in the load balancing operation after the cable modem is assigned to the appropriate LBG. However, the cable modem is listed in the **show cable load-balance docsis-group pending** command.

## Examples

The following example shows how to enable DOCSIS load balancing on the CMTS using the **cable load-balance docsis-enable** command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-enable
Config: Last Batch 0, 38 bytes
cable load-balance docsis-enable
end
Router(config)#
```

## Related Commands

| Command                                     | Description                                                                                                            |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                  |
| <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical and operational information for load balancing operations on the router. |

# cable load-balance docsis30-enable

To enable DOCSIS 3.0 static modem count-based load balancing, use the **cable load-balance docsis30-enable** command in global configuration mode. To disable DOCSIS 3.0 static modem count-based load balancing, use the **no** form of this command.

**cable load-balance docsis30 enable [downstream-only]**

**no cable load-balance docsis30 enable**

## Syntax Description

|                        |                                                                                  |
|------------------------|----------------------------------------------------------------------------------|
| <b>downstream-only</b> | Enables only downstream load balancing without enabling upstream load balancing. |
|------------------------|----------------------------------------------------------------------------------|

## Command Default

By default, DOCSIS 3.0 static modem count-based load balancing is enabled.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                             |
|--------------|--------------------------------------------------------------------------|
| 12.2(33)SCF1 | This command was introduced.                                             |
| 12.2(33)SCH1 | This command was modified. The <b>downstream-only</b> keyword was added. |

## Usage Guidelines

Use the **downstream-only** keyword to enable only the downstream load balancing. When the **downstream-only** keyword is used, upstream load balancing is disabled.

## Examples

The following example shows how to disable DOCSIS 3.0 static modem count-based load balancing:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# no cable load-balance docsis30-enable
Router(config)#
```

The following example shows how to enable only downstream load balancing, without enabling upstream load balancing:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis30-enable downstream-only
Router(config)#
```

The following example shows how to verify if the DOCSIS 3.0 static modem count-based load balancing is disabled:

```
Router# show cable load-balance | include DOCSIS 3
```

```
DOCSIS 2.0 LB Enabled: Yes DOCSIS 3.0 LB Enabled: No
DOCSIS 3.0 General LB
```

The following example shows how to enable DOCSIS 3.0 static modem count-based load balancing:

```
Router# configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis30-enable
Router(config)#
```

The following example shows how to verify if DOCSIS 3.0 static modem count-based load balancing is enabled:

```
Router# show cable load-balance | include DOCSIS 3
```

```
DOCSIS 2.0 LB Enabled: Yes DOCSIS 3.0 LB Enabled: Yes
DOCSIS 3.0 General LB
```

Effective with Cisco IOS Release 12.2(33)SCH1, the output of the **show cable load-balance** command shows the status of the **downstream-only** keyword configuration. The following example shows how to verify if only downstream load balancing is enabled:

```
Router#show cable load-balance
Load for five secs: 0%/0%; one minute: 0%; five minutes: 0%
Time source is NTP, 20:22:33.307 UTC Wed Jul 17 2013
Legacy Group Interval Method DCC Init Threshold
Group Index Technique Minimum Static Enforce Ugs
PCMM
1 513 30 modems 0 5 10% --- ---

```

```
DOCSIS 2.0 LB Enabled: Yes DOCSIS 3.0 LB Downstream Enabled: Yes DOCSIS 3.0 LB U
pstream Enabled: No
```

| DOCSIS Group | Status | Interval | DCC mask    | Policy | Method | Threshold     |
|--------------|--------|----------|-------------|--------|--------|---------------|
| Group Index  |        |          | /UCC        |        | DS/US  | M/E/U/P/S     |
| 1            | GE     | 30       | 0xF8(0)/N 5 |        | m/m    | 5/10/70/70/50 |
| 2            | RE     | 30       | 0x40(1)/N 1 |        | m/m    | 2/2/70/70/50  |

```
DOCSIS 3.0 General LB
```

| MD      | FN | Group S | Intv | DCC mask    | Policy | Mtd | MD-CM-SG | Threshold     |
|---------|----|---------|------|-------------|--------|-----|----------|---------------|
|         |    | Index   |      | /UCC        |        | D/U |          | M/E/U/P/S     |
| Ca5/0/0 | 1  | 32768   | E 30 | 0xF8(0)/N 0 |        | m/m | 0x101    | 5/10/70/70/50 |

```
Router#
```

## Associated Features

The **cable load-balance docsis30-enable** command is used to configure the following features:

- [Load Balancing, Dynamic Channel Change, and Dynamic Bonding Change on the Cisco CMTS Routers](#)
- [Restricted/General Load Balancing and Narrowband Dynamic Bandwidth Sharing with Downstream Dynamic Load Balancing](#)

## Related Commands

| Command                                     | Description                                                                                                                |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>show cable load-balance</b>              | Displays real-time configurational, statistical and operational information for load balancing operations on the router.   |
| <b>show cable load-balance docsis-group</b> | Displays real-time configurational, statistical, and operational information of the DOCSIS group operations on the router. |

# cable load-balance docsis-group

To configure a DOCSIS load balancing group (LBG) on the CMTS, use the **cable load-balance docsis-group** command in the global configuration mode. To delete a DOCSIS load balancing group and to remove it from the CMTS configuration, use the **no** form of this command.

**cable load-balance docsis-group** *docsis-group-id*

**no cable load-balance docsis-group** *docsis-group-id*

## Cisco uBR10012 Router

**cable load-balance docsis-group** **FN** *fn-id* **MD** *cable slot/subslot/port*

## Cisco uBR7225VXR and Cisco uBR7246VXR Routers

**cable load-balance docsis-group** **FN** *fn-id* **MD** *cable slot/port*

| Syntax Description |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>docsis-group-id</i>                   | DOCSIS load balance group ID. A valid DOCSIS load balance group ID ranges from 1 to 2147483647 and does not overlap with the legacy LBG ID. Therefore, both <b>cable load-balance group 1</b> and <b>cable load-balance docsis-group 1</b> commands can be configured. The DOCSIS load balance group ID ranging from 2147483648 to $2^{32}-1$ is reserved for DOCSIS 3.0 general load balancing group (GLBG).                                                                                                       |
|                    | <b>FN</b> <i>fn-id</i>                   | Specifies the fiber node (FN) where certain DOCSIS 3.0 GLBG parameters, such as <b>disable</b> , <b>docsis-policy</b> , <b>init-tech-list</b> , <b>interval</b> , <b>method</b> , <b>policy</b> , and <b>threshold</b> , can be configured.                                                                                                                                                                                                                                                                         |
|                    | <b>MD</b> <i>cable slot/subslot/port</i> | Specifies the MAC domain interface of the fiber node. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. The permitted range is from 5 to 8.</li> <li><i>subslot</i>—Subslot where the line card resides. The available slots are 0 or 1.</li> <li><i>port</i>—The downstream controller number on the line card. The permitted <i>port</i> range is from 0 to 4.</li> </ul>                                                                                                      |
|                    | <b>MD</b> <i>cable slot/port</i>         | Specifies the MAC domain interface of the fiber node on the Cisco uBR7246VXR or Cisco uBR7225VXR router. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides.               <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> </ul> </li> <li><i>port</i>—Downstream controller number on the line card. The permitted <i>port</i> values are 0 or 1.</li> </ul> |
| Command Default    | None                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

**Usage Guidelines** The **cable load-balance docsis-group** command creates a DOCSIS LBG with the specified number and then enters the config-lb-group configuration mode. Use the config-lb-group configuration mode to configure the DOCSIS LBG

- **disable**
- **docsis-policy**
- **downstream**
- **init-tech-list**
- **init-tech-ovr**
- **interval**
- **method**
- **policy**
- **restricted**
- **service-type-id**
- **tag**
- **threshold**
- **upstream**

**Examples** The following example shows how to create a DOCSIS group numbered "1":

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# init-tech-list 1 ucc
Router(config-lb-group)# downstream Cable 1/1
Router(config-lb-group)# upstream Cable 1/0 2
Router(config-lb-group)# docsis-policy 0
Router(config-lb-group)# init-tech-ovr Cable 1/1 1 Cable 1/0 2 init-tech-list 1 ucc
Router(config-lb-group)# service-type-id ccc
Router(config-lb-group)# tag t1
Router(config-lb-group)# interval 10
Router(config-lb-group)# method modems us-method modems
Router(config-lb-group)# no policy us-across-ds pure-ds-load ugs
Router(config-lb-group)# restricted
Router(config-lb-group)# threshold pcmm 70 load 10 stability 50 ugs 70
Router(config-lb-group)#
```

The following example shows how to configure DOCSIS 3.0 GLBG parameters:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group FN 2 MD cable 1/0
```

| Related Commands | Command                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>docsis-policy</b>   | Assigns a policy to a group, which is the default policy assigned to the CM when the CM is not assigned a different policy.                                                                                                                                                                                                                                                                                                                                                                                               |
|                  | <b>downstream</b>      | Sets downstream RF channels.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | <b>upstream</b>        | Sets upstream channels.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                  | <b>init-tech-list</b>  | Sets the DCC/DBC initialization techniques that the CMTS uses to load balance cable modems. The <b>init-tech-list</b> command can also be used to determine whether UCC can be used for modems during dynamic upstream load balancing.                                                                                                                                                                                                                                                                                    |
|                  | <b>init-tech-ovr</b>   | <p>Sets DCC initialization techniques that overrides the physical upstream channel pair. The <b>init-tech-ovr</b> command can also be used to determine whether UCC can be used for modems during dynamic upstream load balancing.</p> <p><b>Note</b> The <b>init-tech-list</b> command accepts an upstream that is not added into the load balancing group. The upstream channel pair is invalid until the upstream is added. When the load balancing group is removed, all upstream channel pairs are also removed.</p> |
|                  | <b>interval</b>        | Sets the duration of time the CMTS waits before checking the load on an interface.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                  | <b>method</b>          | Selects the method the CMTS uses to determine the load. US methods can be different from DS methods.                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                  | <b>policy</b>          | Selects modems, based on the type of service flow that will be balanced.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                  | <b>restricted</b>      | Selects the restricted group type. By default, the general group type is selected.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                  | <b>service-type-id</b> | Adds a service type ID that is compared with the cable modem provisioned service type ID, to determine an appropriate restricted load balancing group (RLBG).                                                                                                                                                                                                                                                                                                                                                             |
|                  | <b>tag</b>             | Adds a tag to the load balancing group. The tag is used to assign the RLBG to the CMs that have the same tag name.                                                                                                                                                                                                                                                                                                                                                                                                        |
|                  | <b>threshold</b>       | Specifies the threshold percentage of use exceeding which load balancing occurs.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                  | <b>cable tag</b>       | Configures the tag that gets added to the load balancing group.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



# cable load-balance docsis-policy

To create a DOCSIS policy and associate an existing rule and tag with the policy, use the **cable load-balance docsis-policy** command in global configuration mode. To remove a DOCSIS policy, rule, or tag from the policy, use the **no** form of this command.

**cable load-balance docsis-policy** *policy-id* [**rule** *rule-id* | **tag** *tag name* [**override**] ]

**no cable load-balance docsis-policy** *policy-id* [**rule** *rule-id* | **tag** *tag name* [**override**] ]

## Syntax Description

|                            |                                                                       |
|----------------------------|-----------------------------------------------------------------------|
| <i>policy-id</i>           | Specifies the DOCSIS policy to be created.                            |
| <b>rule</b> <i>rule-id</i> | Specifies the rule to be used with the DOCSIS policy.                 |
| <b>tag</b> <i>tag name</i> | Specifies the tag to be used with the DOCSIS policy.                  |
| <b>override</b>            | Overrides all the policies in the CM that has the specified tag name. |

## Command Default

No default behavior or values for this command

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                       |
|-------------|----------------------------------------------------|
| 12.2(33)SCB | This command was introduced.                       |
| 12.2(33)SCC | The <b>tag</b> parameter was added to the command. |

## Usage Guidelines

This command associates a rule with a policy. A policy is created only when a rule is associated with it. Similarly, the policy is removed if you remove the last rule associated with the policy.

## Examples

The following example defines a DOCSIS policy, and associates a predefined rule and tag with this policy:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-policy 1 rule 1
Router(config)# cable load-balance docsis-policy 1 tag SPG override
Router(config)#
```

## Related Commands

| Command                        | Description                                                             |
|--------------------------------|-------------------------------------------------------------------------|
| <b>cable load-balance rule</b> | Creates a rule to prevent CM from disabling or enabling load balancing. |
| <b>cable tag</b>               | Creates a tag to associate it with DOCSIS policies and groups.          |

# cable load-balance exclude

To exclude a particular cable modem, or all cable modems from a particular vendor, from one or more forms of load-balancing operations, use the **cable load-balance exclude** command in global configuration mode. To end the exclusion, so that these particular cable modems are subject to the load-balancing policies of the load-balance group to which they belong, use the **no** form of this command.

```
cable load-balance exclude { device-class id | modem mac-address | oui word } [mask | assignment
| enforce | static | strict]

no cable load-balance exclude { device-class id | modem mac-address | oui word }
```

Syntax Description

|                                 |                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>device-class</b> <i>id</i>   | Specifies the device class ID of the cable modems to be excluded in a bitmap format (0-ffff).                                                                                                                                       |
| <b>modem</b> <i>mac-address</i> | Specifies the hardware (MAC) address of an individual cable modem to be excluded from load balancing. (You cannot specify a multicast MAC address.)                                                                                 |
| <i>mask</i>                     | (Optional) Specifies the mask for the range (group) of hardware (MAC) addresses, so that the cable modems with hardware (MAC) addresses in that range are excluded from load balancing.                                             |
| <b>oui</b> <i>word</i>          | Specifies the organization unique identifier (OUI) of a vendor, so that cable modems from this vendor are excluded from load balancing. The OUI must be specified as three hexadecimal bytes separated by either periods or colons. |
| <b>assignment</b>               | (Optional) Excludes the cable modems that were moved into a load balancing group in assignment phase.                                                                                                                               |
| <b>enforce</b>                  | (Optional) Excludes the cable modems from dynamic load balancing, but they continue to participate in static load balancing.                                                                                                        |
| <b>static</b>                   | (Optional) Excludes the cable modems from static load balancing, but they continue to participate in passive load balancing and dynamic load balancing.                                                                             |
| <b>strict</b>                   | (Optional) Excludes the cable modems from all forms of load balancing.                                                                                                                                                              |

Command Default

By default, all cable modems on an interface are automatically included in all configured load-balancing operations when that cable interface is assigned to a load-balance group (**no cable load-balance exclude**). When a cable modem is excluded without any options specified, the cable modem is excluded from dynamic and static load balancing, but it continues to participate in passive load balancing.

Command Modes

Global configuration

## Command History

| Release     | Modification                                                                                                                                                                                    |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers.                                                                                                                |
| 12.2(33)SCH | This command was modified with the following argument and keywords: <ul style="list-style-type: none"> <li>• <i>mask</i></li> <li>• <b>assignment</b></li> <li>• <b>device-class</b></li> </ul> |

## Usage Guidelines

The **cable load-balance exclude** command allows you to specify that particular cable modems should not participate in one or more types of load-balancing operations. This might be done for cable modems that are currently provisioned for premium services, for cable modems that do not respond appropriately to upstream channel change (UCC) or channel override messages, or for other reasons.

In particular, you must use the **cable load-balance exclude** command to exclude cable modems that require specific upstream channels or downstream frequencies. Load balancing cannot be done when cable modems are assigned specific channels or frequencies in their DOCSIS configuration files.

You can use the **cable load-balance exclude** command to specify that these cable modems should not participate in the following types of load-balancing operations:

- Static load balancing—Load balancing is done at the time a cable modem registers by specifying the proper target channel in the Downstream Frequency Override or an Upstream Channel ID Override field in the registration response (REG-RSP) message that the Cisco CMTS sends to the cable modem. This is the default form of registration-based load balancing.
- Passive load balancing—Load balancing is done at the time a cable modem registers by ignoring a cable modem's registration request (REG-REQ) message until it uses the correct target channels. Use the **cable load-balance exclude** command to specify this form of load balancing for older cable modems that do not respond well to the active form of load balancing.
- Dynamic load balancing—A form of traffic-based load balancing, in which cable modems are balanced among upstreams and downstreams after they come online, while they are passing traffic. (Dynamic load balancing is enabled using the **enforce** option with the **cable load-balance group threshold** command.)

Use the **cable load-balance exclude** command to exclude a cable modem from any combination of load-balancing operations. [Table 0-10](#) shows which forms of load-balancing operations are excluded and which are enabled for each form of the **cable load-balance exclude** command:

**Table 0-10** *cable load-balance exclude Command*

|                                                    | Static   | Passive  | Dynamic <sup>1</sup> |
|----------------------------------------------------|----------|----------|----------------------|
| Default<br>(no <b>cable load-balance exclude</b> ) | Yes      | Excluded | Yes                  |
| <b>cable load-balance exclude</b>                  | Excluded | Yes      | Excluded             |
| <b>cable load-balance exclude enforce</b>          | Yes      | Excluded | Excluded             |
| <b>cable load-balance exclude static</b>           | Excluded | Yes      | Yes                  |
| <b>cable load-balance exclude strict</b>           | Excluded | Excluded | Excluded             |
| <b>cable load-balance exclude static strict</b>    | Excluded | Excluded | Yes                  |

1. Dynamic load balancing must also be separately enabled for a load-balance group by using the **enforce** option with the **cable load-balance group threshold** command.

**Note**

Excluding cable modems might be required for some cable modems that are not DOCSIS-compliant. Such cable modems can go offline for long periods of time when load balancing is attempted using DOCSIS MAC messages. If this is the case, use the **cable load-balance exclude** command to exclude such cable modems from load-balancing operations until the modem can be upgraded to DOCSIS-compliant software.

Effective with Cisco IOS Release 12.2(33)SCH, you can configure the **cable load-balance exclude** command once to exclude all the STBs, that do not support load balancing, using the *mask* argument. You can also move cable modems that were moved to a load balancing group in assignment phase, using the assignment option.

**Examples**

The following example shows how to exclude a particular cable modem with the MAC address of 0001.0203.0405 from active and dynamic load-balancing operations:

```
Router# config terminal
Router(config)# cable load-balance exclude mac 0001.0203.0405
```

The following example shows how to exclude all cable modems with the OUI of 00.00.0C from active and dynamic load-balancing operations:

```
Router# config terminal
Router(config)# cable load-balance exclude oui 00.00.0C
```

The following example shows how to exclude all cable modems with the OUI of 00.00.0C from dynamic load-balancing operations. These cable modems are still subject to static load-balancing operations.

```
Router# config terminal
Router(config)# cable load-balance exclude oui 00.00.0C enforce
```

The following example shows how to exclude a particular cable modem from all forms of load-balancing operations:

```
Router# config terminal
Router(config)# cable load-balance exclude mac 0001.0203.0405 strict
```

The following example shows how to exclude all the cable modems with MAC address 0016.924f.82b4 and mask f000.0000.0000 which have been moved to the load balancing group in the assignment phase.

```
Router# configure terminal
Router(config)# cable load-balance exclude modem 0016.924f.82b4 f000.0000.0000 assignment
```

The following example shows how to exclude cable modems from DOCSIS load balance based on the cable modem device class:

```
Router# config terminal
Router(config)# cable load-balance exclude device-class 1
```

**Associated Features**

The **cable load-balance exclude** command is associated with the [Excluding Cable Modems from a Load Balancing Group](#) feature.

| Related Commands | Command                                                   | Description                                                                                                               |
|------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance group (global configuration)</b>    | Creates and configures a load-balance group.                                                                              |
|                  | <b>cable load-balance group (interface configuration)</b> | Assigns a downstream to a load-balance group.                                                                             |
|                  | <b>cable load-balance group interval</b>                  | Configures the frequency of the load-balancing policy updates.                                                            |
|                  | <b>cable load-balance group policy ugs</b>                | Configures how the Cisco CMTS should load balance cable modems with active unsolicited grant service (UGS) service flows. |
|                  | <b>cable load-balance group threshold</b>                 | Configures the threshold values that a load-balance group should use for load-balancing operations.                       |
|                  | <b>cable upstream load-balance group</b>                  | Assigns an upstream to a load-balance group.                                                                              |
|                  | <b>clear cable load-balance</b>                           | Clears the counters or state machine used to track load-balancing operations.                                             |
|                  | <b>show cable load-balance</b>                            | Displays real-time statistical and operational information for load-balancing operations.                                 |

# cable load-balance group

To create a load-balance group and configure the type of load-balancing to be used, use the **cable load-balance group** command in global configuration mode. To delete a load-balance group, use the **no** form of this command. To reset a load-balance group to its default configuration, use the **default** form of this command.

```
cable load-balance group n [method utilization | method modem | method service-flows]

no cable load-balance group n
```

|                    |                             |                                                                                                                                                                                                                                                                                |
|--------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i>                    | Specifies the number of the load balance group. In Cisco IOS Release 12.2(33)SCE3 and earlier, the valid range is from 1 to 80. In Cisco IOS Release 12.2(33)SCE4 and later, the valid range is from 1 to 256.                                                                 |
|                    | <b>method modem</b>         | (Optional) Specifies that the load-balance group should use the number of active cable modems on an interface to determine the current load (default). This method does not take into account the amount of traffic flowing through those particular cable modems.             |
|                    | <b>method service-flows</b> | (Optional) Specifies that the load-balance group should use the number of active service flow IDs (SFIDs) on an interface to determine the current load.                                                                                                                       |
|                    | <b>method utilization</b>   | (Optional) Specifies that the load-balance group should use an interface's current percentage of utilization to determine the current load.                                                                                                                                    |
|                    | <b>Tip</b>                  | The <b>utilization</b> method does not begin moving cable modems for load balancing until the utilization of the interface is at 25 percent or more. This is done to avoid the unnecessary moving of cable modems due to temporary spikes in an interface's utilization rates. |

|                 |                                                                                                                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command Default | No load-balance groups are created. By default, a load-balance group uses the actual number of cable modems online each interface to determine load balancing needs ( <b>modem</b> option). |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                             |                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Note | If you do not create any load-balance groups, the Cisco CMTS defaults to using a form of registration-based load balancing that attempts to equally distribute cable modems among upstreams at the time the cable modems register and come online. No load balancing is done for downstreams or for cable modems that are already online. |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|               |                      |
|---------------|----------------------|
| Command Modes | Global configuration |
|---------------|----------------------|

| Command History | Release      | Modification                                                                     |
|-----------------|--------------|----------------------------------------------------------------------------------|
|                 | 12.2(15)BC1  | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers. |
|                 | 12.2(33)SCE4 | The valid range for the load balance group was changed.                          |

## Usage Guidelines

The **cable load-balance** command creates a load-balance group, which can then be assigned to a number of upstream and downstream cable interfaces to allow the Cisco CMTS to load balance cable modems as needed. The Cisco CMTS can use the load-balance groups for static, passive, and dynamic load balancing of both upstream and downstream channels. You can configure downstreams and upstreams to use the same load balancing parameters, or you can configure upstreams and downstreams separately.



### Note

You can create a maximum of 20 load-balance groups on each chassis. However, you can reuse those load-balance groups on different sets of cable interfaces, as long as they are in different domains. If downstreams are not included in a load-balance group, then each downstream can be considered a separate domain.

Use the **cable load-balance group (global configuration)** command to initially create and configure a load-balance group. Then use the **cable load-balance group (interface configuration)** command to assign this load-balance group to an upstream or downstream, so that the cable interface will begin participating in load-balancing operations.

You can configure a load-balance group to use one of the following types of load-balancing methods:

- **Modem Method**—Uses the number of active cable modems on an interface.
- **Service Flow Method**—Uses the number of active Service Flow IDs (SFIDs) on an interface.
- **Utilization Method**—Uses an interface's current percentage of utilization.

See the following sections for more information about each method.

## Modem Method

The **modem** method of load-balancing uses the number of active cable modems on an interface to determine the current load. This is a form of distribution-based load balancing, in which the absolute numbers of modems are used to determine whether interfaces are load balanced.

This method does not take into account the amount of traffic flowing through the cable modems, but the system does take into account the relative bandwidth of the channels being used, so that channels with higher bandwidths are allocated higher numbers of cable modems. This means that when interfaces are using different channel widths or modulation profiles, the system can assign different numbers of cable modems to the interfaces to achieve a balanced load. For example:

- **Channel widths**— If two upstreams are being load balanced, and one upstream is configured with a channel width of 1.6 MHz and the other upstream is configured for a channel width of 3.2 MHz, the Cisco CMTS allocates twice as many cable modems to the second upstream, because its channel width is twice as large as the first upstream's channel width.
- **Modulation profiles**— If one downstream is configured for 64-QAM and the other downstream is configured for 256-QAM, the Cisco CMTS allocates a proportionately larger number of cable modems to the second downstream so as to achieve a balanced load.

When both the channel width and different modulation profile are set differently on two interfaces, the system calculates a “weight” value to use as a guide to determine the relative bandwidths of the interfaces.



### Tip

In a system with balanced loads, the interfaces will contain the same number of cable modems only when the interfaces are configured with the same modulation parameters.

## Service Flow Method

The **service-flows** method of load balancing uses the number of active service flow IDs (SFIDs) on an interface to determine the current load. This is a form of distribution-based load balancing, in which the absolute numbers of service flows are used to determine whether interfaces are load balanced.

This method does not take into account the amount of traffic flowing on each SFID, but the system does take into account the relative bandwidth of the channels being used, so that channels with higher bandwidths are allocated higher numbers of SFIDs. This means that when interfaces are using different channel widths or modulation profiles, the system can assign different numbers of SFIDs to the interfaces to achieve a balanced load. For example:

- Channel widths— For example, if two upstreams are being load balanced, and one upstream is configured with a channel width of 1.6 MHz and the other upstream is configured for a channel width of 3.2 MHz, the Cisco CMTS allocates twice as many SFIDs to the second upstream, because its channel width is twice as large as the first upstream's channel width.
- Modulation profiles— For example, if one downstream is configured for 64-QAM and the other downstream is configured for 256-QAM, the Cisco CMTS allocates a proportionately larger number of SFIDs to the second downstream so as to achieve a balanced load.

When both the channel width and different modulation profile are set differently on two interfaces, the system calculates a “weight” value to use as a guide to determine the relative bandwidths of the interfaces.

**Tip**

In a system with balanced loads, the interfaces will contain the same number of SFIDs only when the interfaces are configured with the same modulation parameters.

## Utilization Method

The **utilization** method uses an interface's current percentage of utilization to determine the current load. This method uses the amount of traffic being sent over an interface, in the form of the percentage of total bandwidth being used. (To avoid unnecessary movement of cable modems, the **utilization** method does not perform load balancing until an interface is at least 25 percent of utilization.)

**Note**

Do not use the **utilization** method of load balancing on cable interfaces that have a small number of cable modems and where a single modem is responsible for the majority of the interface load. In this condition, the Cisco CMTS could end up continually moving cable modems from one interface to another in an endless attempt to load balance the interfaces. To avoid this, configure the utilization threshold to a value that is higher than what can be caused by any single cable modem.

When using the **utilization** method, the system takes into account the relative throughput and bandwidth (as determined by the modulation profiles and channel widths) of each interface when evaluating the load on those interfaces. For example, if two upstreams are being load-balanced using the utilization method, and the first upstream has twice the bandwidth of the second upstream, the two upstreams are considered balanced when they reach the same percentage of utilization. The first upstream is carrying more traffic than the second upstream because it has a larger capacity for traffic, but the percentage of utilization will be the same.



**Note**

Certain conditions can cause a system instability that could result in the Cisco CMTS endlessly attempting to load balance the interfaces. For example, this situation could occur in noisy environments, where cable modems drop offline on a regular basis, or when cable modems are repeatedly trying to register because the provisioning system has sent them the wrong DOCSIS configuration files. If the Cisco CMTS detects such unstable situations, it does not load balance cable modems from those interfaces until the system stabilizes. However, if the system instability persists, you should increase the threshold values using the **cable load-balance group threshold** command until you can solve the stability problems.

Use the **no** form of this command to delete a load-balance group. Deleting a load-balance group also automatically removes all upstream and downstream channel associations that were made with that group using the **cable load-balance** and **cable upstream load-balance** commands.

**Tip**

To exclude individual cable modems from one or more types of load balancing, use the **cable load-balance exclude** command.

**Examples**

The following example shows how to create a load-balance group numbered 10, using the default method of **modem**, which specifies that the Cisco CMTS uses the actual number of cable modems that are online to determine load-balancing operations.

```
Router# config terminal
Router(config)# cable load-balance group 10
Router(config)#
```

The following example shows how to create a load-balance group numbered 1, which uses the number of active SFIDs on an interface to determine the current load on the interface:

```
Router# config terminal
Router(config)# cable load-balance group 1 method service-flows
Router(config)#
```

**Associated Features**

The **cable load-balance group** command is used to configure the following features:

- [IGMP-Triggered Dynamic Channel Change Load Balancing for DOCSIS 2.0 Cable Modems](#)
- [Load Balancing and Dynamic Channel Change on the Cisco CMTS Routers](#)
- [Restricted/General Load Balancing and Narrowband Dynamic Bandwidth Sharing with Downstream Dynamic Load Balancing](#)

**Related Commands**

| Command                                                   | Description                                                                                                                           |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance exclude</b>                         | Excludes a particular cable modem, or all cable modems from a particular vendor, from one or more types of load-balancing operations. |
| <b>cable load-balance group (interface configuration)</b> | Assigns a downstream to a load-balance group.                                                                                         |
| <b>cable load-balance group interval</b>                  | Configures the frequency of the load-balancing policy updates.                                                                        |

| Command                                    | Description                                                                                                               |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance group policy ugs</b> | Configures how the Cisco CMTS should load balance cable modems with active unsolicited grant service (UGS) service flows. |
| <b>cable load-balance group threshold</b>  | Configures the threshold values that a load-balance group should use for load-balancing operations.                       |
| <b>cable upstream load-balance group</b>   | Assigns an upstream to a load-balance group.                                                                              |
| <b>clear cable load-balance</b>            | Clears the counters or state machine used to track load-balancing operations.                                             |
| <b>show cable load-balance</b>             | Displays real-time statistical and operational information for load-balancing operations.                                 |

# cable load-balance group (interface)

To assign a downstream cable interface to a load balance group, use the **cable load-balance group** command in interface configuration mode. To remove a downstream from a load balance group, use the **no** form of this command.

**cable load-balance group** *n*

**no cable load-balance group** *n*

## Syntax Description

|          |                                                                                                                                                                                                                                                           |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i> | Specifies the number of the load balance group to which the downstream should be assigned. In Cisco IOS Release 12.2(33)SCE3 and earlier, the valid range is from 1 to 80. In Cisco IOS Release 12.2(33)SCE4 and later, the valid range is from 1 to 256. |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

A downstream is not assigned to a load balance group. When you use this command to add a downstream to a group, it also automatically adds all of the associated upstreams to the same group, unless you have also used the **cable upstream load-balance group** command to assign the upstreams to different groups.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release      | Modification                                                                     |
|--------------|----------------------------------------------------------------------------------|
| 12.2(15)BC1  | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers. |
| 12.2(33)SCE4 | The valid range for the load balance group was changed.                          |

## Usage Guidelines

After you have used the **cable load-balance group (global configuration)** command to initially create and configure a load balance group, use the **cable load-balance group (interface configuration)** command to assign this load balance group to a downstream. This enables the cable interface to begin participating in load-balancing operations.



### Tip

Use the **cable upstream load-balance group** command to assign this load balance group to an upstream.

The following rules apply when creating and assigning load balance groups:

- A downstream or upstream can belong to only one load balance group.
- All downstreams and upstreams in a load balance group must share physical radio frequency (RF) connectivity to the same group of cable modems. Downstreams can be in a separate load balance group than upstreams, but all downstreams or all upstreams that have the same RF physical connectivity must be members of the same load balance group. You cannot distribute downstreams or upstreams that share physical connectivity across multiple load balance groups.

**Note**

If both downstreams and upstreams are assigned to the same load balance group, the Cisco CMTS attempts to balance both the downstream and upstream values when it moves cable modems.

- If the load balance group includes downstream interfaces, you must also configure the downstream center frequency on those interfaces, using the **cable downstream frequency** cable interface command. This command is informational-only on cable interfaces that use an external upconverter, but it is required for load balancing, so that the Cisco CMTS knows where to move cable modems when it is load balancing downstreams.
- Load balancing is done only on a per-chassis basis—all interfaces in a load balance group must be in the same chassis.

**Note**

In Cisco IOS Release 12.2(15)BC1, you can configure an interface for both load balancing and Hot-Standby Connection-to-Connection (HCCP) N+1 redundancy, but load balancing does not continue after a switchover from a Working to a Protect interface. Load balancing resumes when the Cisco CMTS switches back to the Working interface.

**Examples**

The following example shows how to assign the first downstream on the cable interface line in slot five to load balance group 5:

```
Router# config terminal
Router(config)# interface cable 5/0
Router(config-if)# cable load-balance group 5
Router(config-if)#
```

**Associated Features**

The **cable load-balance group** command is used to configure the following features:

- [IGMP-Triggered Dynamic Channel Change Load Balancing for DOCSIS 2.0 Cable Modems](#)
- [Load Balancing and Dynamic Channel Change on the Cisco CMTS Routers](#)
- [Restricted/General Load Balancing and Narrowband Dynamic Bandwidth Sharing with Downstream Dynamic Load Balancing](#)

**Related Commands**

| Command                                                | Description                                                                                                                           |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance exclude</b>                      | Excludes a particular cable modem, or all cable modems from a particular vendor, from one or more types of load-balancing operations. |
| <b>cable load-balance group (global configuration)</b> | Creates and configures a load balance group.                                                                                          |
| <b>cable load-balance group interval</b>               | Configures the frequency of the load balancing policy updates.                                                                        |
| <b>cable load-balance group policy ugs</b>             | Configures how the Cisco CMTS should load balance cable modems with active unsolicited grant service (UGS) service flows.             |
| <b>cable load-balance group threshold</b>              | Configures the threshold values that a load balance group should use for load-balancing operations.                                   |

| Command                                  | Description                                                                               |
|------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>cable upstream load-balance group</b> | Assigns an upstream to a load balance group.                                              |
| <b>clear cable load-balance</b>          | Clears the counters or state machine used to track load balancing operations.             |
| <b>show cable load-balance</b>           | Displays real-time statistical and operational information for load balancing operations. |

# cable load-balance group (Supporting Dynamic Channel Change)

To set multiple parameters for Load Balancing with Dynamic Channel Change (DCC), use the following command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable load-balance group** *group-num* { **dcc-init-technique** | **interval** | **method** | **policy** | **threshold** }

**no cable load-balance group** *group-num* { **dcc-init-technique** | **interval** | **method** | **policy** | **threshold** }

## Syntax Description

|                           |                                          |
|---------------------------|------------------------------------------|
| <b>dcc-init-technique</b> | Sets DCC initialization technique        |
| <b>interval</b>           | Sets interface polling interval          |
| <b>method</b>             | Sets upstream load balancing type/method |
| <b>policy</b>             | Sets load balancing policy               |
| <b>threshold</b>          | Load balancing threshold in percentage   |

## Command Default

Load balancing is not configured by default on the Cisco CMTS.

## Command Modes

Global configuration mode.

## Command History

| Release     | Modification                                                                                                                                                                                           |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC | This command was introduced on the Cisco uBR10012 router and the Cisco uBR7246VXR router, with supporting broadband processing engines (BPEs) or cable interface line cards on the respective routers. |

## Examples

The following example illustrates configuration of the initialization techniques specified for DCC:

```
Router(config)# cable load-balance group 1 dcc-init-technique 4
```

For further examples of this command, and related keywords, refer to related commands, and refer also to [Configuring Load Balancing and Dynamic Channel Change \(DCC\) on the Cisco CMTS](#).

## Usage Guidelines

This command is subject to the restrictions and prerequisites described in [Configuring Load Balancing and Dynamic Channel Change \(DCC\) on the Cisco CMTS](#).

## Related Commands

| Command                                                                                          | Description                                                                                                                                  |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance group</b><br><b>dcc-init-technique</b> (Supporting Dynamic Channel Change) | Sets the initialization technique for Dynamic Channel Change (DCC) for Load Balancing.                                                       |
| <b>cable load-balance group policy</b> (Supporting Dynamic Channel Change)                       | Sets the type of service flow for use with Load Balancing and DCC, whether PacketCable MultiMedia (PCMM) or Unsolicited Grant Service (UGS). |

| Command                                                                       | Description                                                                                                                                    |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance group threshold (Supporting Dynamic Channel Change)</b> | Sets the threshold levels for corresponding service flow types for the specified Load Balancing group, supporting Dynamic Channel Change (DCC) |
| <b>show controllers cable</b>                                                 | Displays statistics for Dynamic Channel Change (DCC) for load balancing.                                                                       |
| <b>test cable dcc (Supporting Dynamic Channel Change)</b>                     | Performs testing functions for Load Balancing with DCC                                                                                         |

# cable load-balance group interval

To configure the frequency of the load-balancing policy updates, use the **cable load-balance group interval** command in global configuration mode. To reset the frequency of the policy updates to its default values, use the **no** form of this command.

**cable load-balance group *n* interval *interval***

**no cable load-balance group *n* interval**

|                    |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i>        | Specifies the number of the load balance group. In Cisco IOS Release 12.2(33)SCE3 and earlier, the valid range is from 1 to 80. In Cisco IOS Release 12.2(33)SCE4 and later, the valid range is from 1 to 256.                                                                                                                                                                                                                                                                                                       |
|                    | <i>interval</i> | Specifies the frequency, in seconds, for how often the Cisco CMTS router should determine the current load on each cable interface. This also determines the minimum time between when cable modems can be moved to load balance the interfaces. One cable modem at most is moved during each interval time period. The valid range is 1 to 1000 seconds. The default value is 10 seconds in Cisco IOS Release 12.2(33)SCE and earlier. The default value is 30 seconds in Cisco IOS Release 12.2(33)SCE1 and later. |

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Command Default | Each load balance group uses the default interval value, if the interval time period is not specified. |
|-----------------|--------------------------------------------------------------------------------------------------------|

|               |                      |
|---------------|----------------------|
| Command Modes | Global configuration |
|---------------|----------------------|

| Command History | Release      | Modification                                                                                 |
|-----------------|--------------|----------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC1  | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers.             |
|                 | 12.2(33)SCE1 | The default value for the <b>interval</b> keyword was changed from 10 seconds to 30 seconds. |
|                 | 12.2(33)SCE4 | The valid range for the load balance group was changed.                                      |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | <p>To properly perform load balancing, the Cisco CMTS must determine the actual load on an interface on a periodic basis. This frequency of the updates also determines how frequently cable modems can be moved to achieve balanced loads. One cable modem, at most, is moved during each update period.</p> <p>The more often these updates are performed, the more accurate the Cisco CMTS can be in performing its load balancing operations. As a general rule, begin with the default frequency value, and then adjust the value accordingly, in small increments, as load balancing conditions or performance levels might require. The default interval value was changed in Cisco IOS Release 12.2(33)SCF to reduce thrashing of cable modems when utilization-based method is used with DOCSIS load balancing.</p> |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



**Note**

Having too small an interval could result in cable modems being constantly moved to achieve balanced loads during peak usage times when load balance could spike to transient heavy traffic. Also, more frequent updates can have a performance impact, especially on routers with a large number of active interfaces and cable modems.

**Examples**

The following example shows how to configure load-balance group 3 so that it performs a policy update every 30 seconds:

```
Router# config terminal
Router(config)# cable load-balance group 3 interval 30
Router(config)#
```

The following example shows how to reset load-balance group 10 to its default update frequency of 10 seconds:

```
Router# config terminal
Router(config)# no cable load-balance group 10 interval
Router(config)#
```

**Associated Features**

The **cable load-balance group interval** command is used to configure the following feature:

- [Load Balancing and Dynamic Channel Change on the Cisco CMTS Routers](#)

**Related Commands**

| Command                                                   | Description                                                                                                                           |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance exclude</b>                         | Excludes a particular cable modem, or all cable modems from a particular vendor, from one or more types of load-balancing operations. |
| <b>cable load-balance group (global configuration)</b>    | Creates and configures a load-balance group.                                                                                          |
| <b>cable load-balance group (interface configuration)</b> | Assigns a downstream to a load-balance group.                                                                                         |
| <b>cable load-balance group policy ugs</b>                | Configures how the Cisco CMTS should load balance cable modems with active unsolicited grant service (UGS) service flows.             |
| <b>cable load-balance group threshold</b>                 | Configures the threshold values that a load-balance group should use for load-balancing operations.                                   |
| <b>cable upstream load-balance group</b>                  | Assigns an upstream to a load-balance group.                                                                                          |
| <b>clear cable load-balance</b>                           | Clears the counters or state machine used to track load-balancing operations.                                                         |
| <b>show cable load-balance</b>                            | Displays real-time statistical and operational information for load-balancing operations.                                             |

# cable load-balance group policy

The following command is introduced to the Cisco CMTS starting in Cisco IOS Release 12.2(17b)BC4.

To set the type of service flow policy for use with Load Balancing, use the following command in global configuration mode. This enhancement synchronizes the pending statistic between different cable interface line cards in the load balancing group. The result is an alternative downstream load balancing scheme that makes use of per-upstream loads rather than total downstream loads.

To remove this configuration, use the **no** form of this command.

**cable load-balance group** *ds-lb-group-id* **policy** *us-groups-across-ds*

**no cable load-balance group** *ds-lb-group-id* **policy** *us-groups-across-ds*

|                    |                            |                                                                                                                                       |
|--------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>ds-lb-group-id</i>      | Specifies the load balancing group being configured. This downstream group includes the upstream segment in load balancing decisions. |
|                    | <i>us-groups-across-ds</i> | Specifies the upstream group to be distributed in load balancing decisions for the downstream group specified.                        |

|                 |                                                                                 |
|-----------------|---------------------------------------------------------------------------------|
| Command Default | By default, this load balancing configuration is not enabled on the Cisco CMTS. |
|-----------------|---------------------------------------------------------------------------------|

|               |                            |
|---------------|----------------------------|
| Command Modes | Global configuration mode. |
|---------------|----------------------------|

| Command History | Release      | Modification                                                                                                                                                                                           |
|-----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(17b)BC4 | This command was introduced on the Cisco uBR10012 router and the Cisco uBR7246VXR router, with supporting broadband processing engines (BPEs) or cable interface line cards on the respective routers. |

|          |                                                                                  |
|----------|----------------------------------------------------------------------------------|
| Examples | The following example illustrates this command and one supported implementation: |
|----------|----------------------------------------------------------------------------------|

```
Router(config)# cable load-balance group 1 policy 2
Router(config)#
```

In this example, a cable modem that comes online on the interface cable 5/0 Upstream 2 could potentially come online on the following interfaces:

- cable 3/0 upstream 2
- cable 4/0 upstream 2
- cable 6/0 upstream 2
- nowhere else, however

With downstream load balancing prior to Cisco IOS Release 12.2(17b)BC4, having 100 cable modems per segment would be possible in an extreme case that distributes cable modems as follows:

|     | U0 | U1 | U2 | U3 | Downstream |
|-----|----|----|----|----|------------|
| 3/0 | 97 | 1  | 1  | 1  | 100        |
| 4/0 | 1  | 97 | 1  | 1  | 100        |
| 5/0 | 1  | 1  | 97 | 1  | 100        |
| 6/0 | 1  | 1  | 1  | 97 | 100        |

**Usage Guidelines**

This command is subject to the restrictions and prerequisites described in [Configuring Load Balancing and Dynamic Channel Change \(DCC\) on the Cisco CMTS](#).

Cisco IOS Release 12.2(17b)BC4 enables the optional operation of making downstream load balancing decisions as follows:

- The target downstream segment is in the same downstream load balancing group as the source downstream segment.
- The upstream load balancing group can be set for the corresponding channel on which a cable modem is balanced.
- The Cisco CMTS automatically locates the upstream segment for a load balancing group and processes the upstream group status on the source interface that has the lowest load.
- The target downstream segment must have an upstream channel set in the upstream load balancing group.
- The highest target upstream segment must carry less load than any other potential target —the highest upstream segment on other interfaces.

This command enables an alternative downstream load balancing scheme that makes use of per-upstream loads rather than total downstream loads.

This enhancement performs downstream load balancing that accounts upstream channel loads in the same upstream load balancing group, rather than on the basis of the entire downstream channel load. Prior Cisco IOS releases may not have distributed cable modems evenly over individual upstream channels, nor in a way that accounted for downstream and upstream together.

This enhancement applies when downstream load balancing occurs on a headend system with separate upstream load balancing segments; the upstream segments are spread over multiple downstreams segments.

This optional configuration supports output of the **show cable load-balance** command so that the command displays more information about loads on channels that are configured on external or remote cable interface line cards.

**Related Commands**

| Command                        | Description                                                                                                                                                                       |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>show cable load-balance</b> | Displays information about loads on channels that are configured on external or remote cable interface line cards, to include integrated per-upstream load balancing information. |

# cable load-balance group policy ugs

To configure whether the Cisco CMTS should load balance cable modems with Unsolicited Grant Service (UGS) service flows (which are typically used for active voice calls), use the **cable load-balance group policy ugs** command in global configuration mode. To reset the load-balance group to its default policy setting, use the **no** form of this command.

**cable load-balance group *n* policy ugs**

**no cable load-balance group *n* policy ugs**

|                           |          |                                                                                                                                                                                                                |
|---------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i> | Specifies the number of the load-balance group. In Cisco IOS Release 12.2(33)SCE3 and earlier, the valid range is from 1 to 80. In Cisco IOS Release 12.2(33)SCE4 and later, the valid range is from 1 to 256. |
|---------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                    |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Defaults</b> | Cable modems with active UGS service flows can be moved for load-balancing ( <b>cable load-balance group <i>n</i> policy ugs</b> ) |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

|                        |                |                                                                                  |
|------------------------|----------------|----------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                              |
|                        | 12.2(15)BC1    | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers. |
|                        | 12.2(33)SCE4   | The valid range for the load balance group was changed.                          |

|                         |                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>cable load-balance group policy ugs</b> command determines whether a load-balance group can move cable modems with UGS service flows, so as to enforce dynamic load balancing policies. Because most voice calls use UGS service flows to allow real-time traffic, this option is primarily used to determine whether the Cisco CMTS will move cable modems with active voice calls. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

If you disable this option (**no cable load-balance group policy ugs**), the Cisco CMTS does not move cable modems with active UGS service flows to a new upstream or downstream. This prevents some possible interruptions of service to these customers, but it could result in denial of service conditions for other customers if the interface starts becoming overloaded.

To avoid this, the default configuration (**cable load-balance group policy ugs**) of this command allows the Cisco CMTS to move cable modems to a new upstream or downstream, even if they have active UGS service flows. This enables the Cisco CMTS to perform optimum load balancing, but it could cause a momentary interruption in the voice call—users on the voice call might hear a momentary drop during the call, but the call should not be terminated.

**Note**

The **cable load-balance group policy ugs** command affects only dynamic load-balancing operations and does not affect static and passive load-balancing operations. Dynamic load balancing is enabled using the **enforce** option with the **cable load-balance group threshold** command.

## Examples

The following example shows how to enable the UGS policy on a load-balance group (the default configuration), so that the Cisco CMTS can move cable modems with active UGS service flows as needed to enforce the current dynamic load balancing policy:

```
Router# config terminal
Router(config)# cable load-balance group 13 policy ugs
Router(config)#
```

The following example shows how to configure a load-balance group so that the Cisco CMTS does not move cable modems with active UGS service flows (default configuration):

```
Router# config terminal
Router(config)# no cable load-balance group 100 policy ugs
Router(config)#
```

## Associated Features

The **cable load-balance group policy ugs** command is used to configure the following feature:

- [Load Balancing and Dynamic Channel Change on the Cisco CMTS Routers](#)

## Related Commands

| Command                                     | Description                                                                                                                           |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance exclude</b>           | Excludes a particular cable modem, or all cable modems from a particular vendor, from one or more types of load-balancing operations. |
| <b>cable load-balance group</b>             | Creates and configures a load-balance group.                                                                                          |
| <b>cable load-balance group (interface)</b> | Assigns a downstream to a load-balance group.                                                                                         |
| <b>cable load-balance group interval</b>    | Configures the frequency of the load-balancing policy updates.                                                                        |
| <b>cable load-balance group threshold</b>   | Configures the threshold values that a load-balance group should use for load-balancing operations.                                   |
| <b>cable upstream load-balance group</b>    | Assigns an upstream to a load-balance group.                                                                                          |
| <b>clear cable load-balance</b>             | Clears the counters or state machine used to track load-balancing operations.                                                         |
| <b>show cable load-balance</b>              | Displays real-time statistical and operational information for load-balancing operations.                                             |

# cable load-balance group threshold

To configure the threshold values that a load-balance group should use for load-balancing operations, use the **cable load-balance group threshold** command in global configuration mode. To reset the load-balance group to its default threshold values, use the **no** form of this command.

**cable load-balance group *n* threshold** {**load** *load-value* [**enforce** *threshold*] |  
**load minimum** *number* | **stability** *percent* | **ugs** *band-value*}

## Syntax Description

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                          | Specifies the number of the load-balance group. In Cisco IOS Release 12.2(33)SCE3 and earlier, the valid range is from 1 to 80. In Cisco IOS Release 12.2(33)SCE4 and later, the valid range is from 1 to 256.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>load</b> <i>load-value</i>     | <p>Specifies the maximum load difference, as expressed in a percentage of total load, that can exist between interfaces in a load-balance group before the Cisco CMTS performs load balancing. If the load between interfaces is greater than the value specified by <i>load-value</i>, cable modems that are registering are assigned to the lesser-utilized interface until the load difference is once again below this value. The valid range for <i>load-value</i> is 1 to 100 percent, with a default of 10 percent.</p> <p><b>Note</b> The default of 10 percent is the minimum recommended threshold. Do not set this threshold below 10 percent unless you have been instructed to do so by Cisco TAC.</p>                                                                                                     |
| <b>enforce</b> <i>threshold</i>   | <p>(Optional) Enables dynamic load balancing, which moves online cable modems after their initial registration to achieve load balancing of the cable interfaces in a load-balance group. Cable modems that are currently online are moved when the load difference between two interfaces in the load-balance group exceeds this percentage. Modems continue to be moved until the load difference falls below this value.</p> <p>The possible valid range for <i>threshold</i> is 1 to 100 percent, but the <i>threshold</i> must be equal to or greater than the percentage specified with the <i>load-value</i> option. For this reason, the actual minimum for <i>threshold</i> is the current setting of the <i>load-value</i> option. The default is also the same value as the <i>load-value</i> parameter.</p> |
| <b>load minimum</b> <i>number</i> | (Optional) Specifies that cable modems should be moved only if the load between the two interfaces is greater than the specified number of cable modems or service flows (valid only when the method is the number of modems or service flows). The valid range is 1 to 100, with a default of 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                                 |                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>stability</b> <i>percent</i> | Specifies the threshold to be used to determine whether a channel or interface is unstable, in terms of the percentage of successful ranging requests. The <i>percent</i> value specifies the minimum percentage of successful ranging requests that is acceptable; otherwise, the CMTS begins moving CMs. The valid range is 1 to 100 percent, with a default of 50 percent. |
| <b>ugs</b> <i>band-value</i>    | Specifies that the Cisco CMTS should move cable modems with active UGS service flows when the current UGS usage reaches the percentage of total bandwidth available that is specified by the <i>band-value</i> parameter. The valid range for <i>band-value</i> is 0 to 100 percent, with a default of 70 percent.                                                            |
| <b>Note</b>                     | This option is effective only when the <b>enforce</b> option has also been used to enable dynamic load balancing, and the Cisco CMTS has been authorized to move cable modems with active UGS service flows (using the <b>cable load-balance group policy ugs</b> command).                                                                                                   |

### Defaults

The **load** parameter defaults to 10 percent, the **load minimum** parameter defaults to 5, the **stability** parameter defaults to 50 percent, and the **ugs** parameter defaults to 70 percent. By default, only static load balancing is done (no **enforce** option). If the **enforce** option is given without a threshold value, it defaults to the same value as the **load** parameter.

### Command Modes

Global configuration

### Command History

| Release      | Modification                                                                     |
|--------------|----------------------------------------------------------------------------------|
| 12.2(15)BC1  | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers. |
| 12.2(33)SCE4 | The valid range for the load balance group was changed.                          |

### Usage Guidelines

The **cable load-balance group threshold** command configures a load-balance group for the threshold values that it should use to determine when a cable modem should be moved to a new downstream or upstream. You can specify the following different thresholds:

- **load**—Specifies the maximum load usage that can exist between interfaces in a load-balance group before the Cisco CMTS begins static load-balancing operations. The default value of *load-value* is 10 percent, which means that two upstreams or two downstreams can have usage rates that vary up to 10 percent before the Cisco CMTS begins rebalancing the load usage. This rebalancing, however, is done only when cable modems first register with the Cisco CMTS—the Cisco CMTS does not switch cable modems that are already online.

For example, if the **load** value is 10 percent, and upstream 1 is at 23 percent and upstream 2 is at 30 percent, no cable modems are moved. However, if load usage for upstream 2 reaches 35 percent, the Cisco CMTS begins assigning new cable modems, as they register, to upstream 1 until the difference in load usage between the two upstreams falls below 10 percent.



**Note** The default of 10 percent is the minimum recommended threshold. Do not set this threshold below 10 percent unless you have been instructed to do so by Cisco TAC.

- **enforce**—Enables dynamic load balancing, so that the Cisco CMTS can move cable modems that are already online. This option has its own threshold value, which specifies the difference in load usage that must exist between two interfaces in a group before the Cisco CMTS begins moving online cable modems. The Cisco CMTS continues to move cable modems until the difference in load usage rates falls below the threshold value.

When using dynamic load balancing and an upstream channel is overloaded, the Cisco CMTS sends an Upstream Channel Change (UCC) request to a cable modem to instruct it to move to another upstream. The cable modem should move to the new upstream channel, without going offline or having to reregister with the CMTS.

When using dynamic load balancing and a downstream channel is overloaded, the Cisco CMTS sends an abort response to a cable modem's ranging request (RNG-REQ) message. When the cable modem sends a new REG-REQ message, the Cisco CMTS specifies the new downstream channel in the Downstream Frequency Override field in its REG-RSP message. The cable modem must go offline and reregister on the new downstream channel, so as to conform to the DOCSIS 1.0 specifications.



**Note** In Cisco IOS Release 12.2(15)BC1, the dynamic load balancing method results in cable modems going offline and having to reregister whenever the modems are moved between downstreams. This is because the DOCSIS 1.0 specification requires cable modems to reregister whenever the downstream is changed using the Downstream Frequency Override message. Cable modems should not go offline when moved between upstreams.

The Cisco CMTS also continues to enforce the load threshold value to perform static load balancing as well. Therefore, the *threshold* percentage should be equal to or greater than the percentage specified with the **load load-value** option.

For example, if you specify **load 10 enforce 15**, the Cisco CMTS monitors the load usage between cable interfaces in the load-balance group. If upstream 1 reaches 33 percent and upstream 2 reaches 45 percent, the Cisco CMTS begins static load-balancing operations by assigning new cable modems to upstream 1 when they register. If the difference still continues to grow, and upstream 2 reaches 50 percent, the Cisco CMTS also begins dynamic load-balancing operations by moving online cable modems, until the difference in load usage falls below 15 percent. The Cisco CMTS then continues static load-balancing operations until the difference falls below 10 percent.



**Tip** The **enforce** threshold is not displayed in the configuration file if it is the same as the **load** threshold. For example, if you enter the “**cable load-balance group 1 threshold load 50 enforce 50**” command, it appears as “**cable load-balance group 1 threshold load 50 enforce**” in the configuration file.

- **load minimum**—Specifies that cable modems should be moved only if the load between the two interfaces is greater than the specified number of cable modems or service flows. This option is valid only when you have configured the load-balance group using either the **method modem** or **method service-flows** options with the **cable load-balance group** command. It is not used with the **utilization** method.
- **stability**—Specifies the minimum percentage of ranging requests that are successful before the Cisco CMTS determines that the interface or channel is unstable. When the channel has fewer than this percentage of cable modems responding to periodic ranging requests over a one-minute period, the Cisco CMTS begins moving modems to other channels in the load-balance group. For example, when set to 75 percent, the Cisco CMTS begins moving modems when fewer than 75 percent of modems are replying to ranging requests.



- **ugs**—Specifies a threshold for when the Cisco CMTS should move cable modems that have active UGS service flows, which are typically used for active voice calls. This option goes into force only when dynamic load balancing has been enabled (using the **enforce** option), and the Cisco CMTS has been allowed to move cable modems with active UGS service flows (using the **cable load-balance group policy ugs** command). The *band-value* threshold specifies the maximum usage of UGS service flows that should exist before the Cisco CMTS begins moving calls.

For example, if the band-value threshold is at its default of 70 percent, the Cisco CMTS does not begin moving cable modems with active UGS service flows until UGS usage on an upstream or downstream reaches 70 percent of the total available bandwidth. The Cisco CMTS continues moving cable modems that are online with active UGS service flows until the UGS usage on the interface falls below 70 percent.

**Note**

Certain conditions can cause a system instability that could result in the Cisco CMTS endlessly attempting to load balance the interfaces. For example, this situation could occur in noisy environments, where cable modems drop offline on a regular basis, or when cable modems are repeatedly trying to register because the provisioning system has sent them the wrong DOCSIS configuration files. If the Cisco CMTS detects such unstable situations, it does not load balance cable modems from those interfaces until the system stabilizes. However, if the system instability persists, you should increase the threshold values using the **cable load-balance group threshold** command until the system stabilizes.

**Examples**

The following example shows how to configure load-balance group 2 so that it performs static load balancing when the difference between two cable interfaces in the group is 20 percent or more.

```
Router# config terminal
Router(config)# cable load-balance group 2 threshold load 20
Router(config)#
```

The following example shows how to configure load-balance group 5 so that it performs static load balancing when the difference in usage between two cable interfaces in the group is 20 percent or more, and so that it performs dynamic load balancing when the difference in usage is 30 percent or more. The Cisco CMTS will also begin moving cable modems with active UGS service flows when UGS service flows reach 60 percent of the total bandwidth available on the upstream channel.

```
Router(config)# cable load-balance group 5 threshold load 20 enforce 30
Router(config)# cable load-balance group 5 threshold ugs 60
Router(config)# cable load-balance group 5 policy ugs
Router(config)#
```

**Note**

You must configure the load-balance group with the **cable load-balance group policy ugs** command before the Cisco CMTS begins enforcing the threshold that was set with the **cable load-balance group threshold ugs** command.

**Associated Features**

The **cable load-balance group threshold** command is used to configure the following feature:

- [Load Balancing and Dynamic Channel Change on the Cisco CMTS Routers](#)

| Related Commands | Command                                     | Description                                                                                                                           |
|------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance exclude</b>           | Excludes a particular cable modem, or all cable modems from a particular vendor, from one or more types of load-balancing operations. |
|                  | <b>cable load-balance group</b>             | Creates and configures a load-balance group.                                                                                          |
|                  | <b>cable load-balance group (interface)</b> | Assigns a downstream to a load-balance group.                                                                                         |
|                  | <b>cable load-balance group interval</b>    | Configures the frequency of the load-balancing policy updates.                                                                        |
|                  | <b>cable load-balance group policy ugs</b>  | Configures how the Cisco CMTS should load balance cable modems with active unsolicited grant service (UGS) service flows.             |
|                  | <b>cable upstream load-balance group</b>    | Assigns an upstream to a load-balance group.                                                                                          |
|                  | <b>clear cable load-balance</b>             | Clears the counters or state machine used to track load-balancing operations.                                                         |
|                  | <b>show cable load-balance</b>              | Displays real-time statistical and operational information for load-balancing operations.                                             |

# cable load-balance group threshold (Supporting Dynamic Channel Change)

To set the threshold levels and corresponding service flow types for the specified Load Balancing group, supporting Dynamic Channel Change (DCC) on the Cisco router, use the following command in global configuration mode. To remove threshold settings, use the **no** form of this command.

**cable load-balance group *n* threshold {load | pcmm | stability | ugs} {0-100}**

**cable load-balance group *n* threshold ugs <1-100>**

**cable load-balance group *n* threshold load <1-100> {minimum}**

**cable load-balance group *n* threshold load 75 {enforce}**

## Syntax Description

|                  |                                                                                                                                                                                                                |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>         | Specifies the number of the load balance group. In Cisco IOS Release 12.2(33)SCE3 and earlier, the valid range is from 1 to 80. In Cisco IOS Release 12.2(33)SCE4 and later, the valid range is from 1 to 256. |
| <b>load</b>      | Interface load threshold settings                                                                                                                                                                              |
| <b>pcmm</b>      | PCMM service flow threshold                                                                                                                                                                                    |
| <b>stability</b> | Threshold for stability detection                                                                                                                                                                              |
| <b>ugs</b>       | UGS service flow threshold                                                                                                                                                                                     |
| <i>1-100</i>     | Interface utilization threshold in percentage of interface capacity.                                                                                                                                           |
| <b>load</b>      | Interface load threshold settings                                                                                                                                                                              |
| <i>1-100</i>     | Threshold value in percentage                                                                                                                                                                                  |
| <b>minimum</b>   | Set minimum number of modems/flows difference before loadbalancing starts                                                                                                                                      |
| <b>enforce</b>   | Enters the enforce threshold                                                                                                                                                                                   |

## Command Default

Load balancing is not configured by default on the Cisco CMTS.

## Command Modes

Global configuration mode.

## Command History

| Release      | Modification                                                                                                                                                                                           |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC  | This command was introduced on the Cisco uBR10012 router and the Cisco uBR7246VXR router, with supporting broadband processing engines (BPEs) or cable interface line cards on the respective routers. |
| 12.2(33)SCE4 | The valid range for the load balance group was changed.                                                                                                                                                |

## Examples

The following command specifies the reserved bandwidth threshold. Above this level, cable modems with active PCMM service flows participate in load balancing, and the default threshold is 70%. Note that if UGS is used for PCMM, the UGS threshold needs to be crossed as well. The default UGS threshold is 70%.)

**cable load-balance group threshold (Supporting Dynamic Channel Change)**

```
Router(config)# cable load-balance group 4 threshold pcmm <pcmm-value>
```

**Usage Guidelines**

In Cisco IOS releases prior to Cisco IOS Release 12.3(17a)BC, the load balancing default setting is UGS. This is not the case with Cisco IOS Release 12.3(17a)BC. In this latter release, and subsequent releases, configuration is required if the cable modems with active UGS flows are desired to participate in load balancing.

This command is subject to the restrictions and prerequisites described in [Configuring Load Balancing and Dynamic Channel Change \(DCC\) on the Cisco CMTS](#).

**Associated Features**

The **cable load-balance group threshold** command is used to configure the following feature:

- [Load Balancing and Dynamic Channel Change on the Cisco CMTS Routers](#)

**Related Commands**

| Command                                                                                | Description                                                                                                                                  |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance group (Supporting Dynamic Channel Change)</b>                    | Sets multiple parameters for Load Balancing with DCC.                                                                                        |
| <b>cable load-balance group dcc-init-technique (Supporting Dynamic Channel Change)</b> | Sets the initialization technique for Dynamic Channel Change (DCC) for Load Balancing.                                                       |
| <b>cable load-balance group policy (Supporting Dynamic Channel Change)</b>             | Sets the type of service flow for use with Load Balancing and DCC, whether PacketCable MultiMedia (PCMM) or Unsolicited Grant Service (UGS). |
| <b>show controllers cable</b>                                                          | Displays statistics for Dynamic Channel Change (DCC) for load balancing.                                                                     |

# cable load-balance method-utilization min-threshold

To configure the minimum threshold for initiating load balancing under the utilization method , use the **cable load-balance method-utilization min-threshold** command in global configuration mode.

**cable load-balance method-utilization min-threshold** *min\_threshold*

|                           |                      |                                                                                                                                                                       |
|---------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>min_threshold</i> | (Optional) Specifies the minimum threshold value in percentage, of utilization to initiate load balancing. The valid range is from 10 to 90. The default value is 25. |
|---------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Command Default</b> | The minimum utilization threshold is 25 percent. |
|------------------------|--------------------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCH | This command was introduced. |

**Examples** The following example shows how to configure the **cable load-balance method-utilization min-threshold** *min\_threshold* command:

```
Router# enable
Router(config)# cable load-balance method-utilization min-threshold 40
Router(config)# exit
```

| <b>Related Commands</b> | Command                                   | Description                                                                                        |
|-------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------|
|                         | <b>cable load-balance group threshold</b> | Configures the threshold values that a load-balance group should use for load-balancing operations |

# cable load-balance modem max-failures

To configure the number of times a CM can fail before the CM is removed from the dynamic load balancing group, use the **cable load-balance modem max-failures** command in the global configuration mode. To remove the configured number for a CM to fail, use the **no** form of this command.

**cable load-balance modem max-failures** *0-100*

**no cable load-balance modem max-failures**

|                    |       |                                                                                                                                                                                                |
|--------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | 0-100 | Specifies the maximum number of failures before a CM is removed from the dynamic LB. However, if you give the value 0, the <b>cable load-balance modem max-failures</b> command gets disabled. |
|                    |       | <b>Note</b> The CM is excluded from the dynamic load balance operations after it has failed the specified number of times, however it still belongs to a LBG.                                  |

|                 |                          |
|-----------------|--------------------------|
| Command Default | The default value is 10. |
|-----------------|--------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCC | This command was introduced. |

|          |                                                                                                                                                                                                                                                                                                    |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to configure CM using the <b>cable load-balance modem max-failures</b> command.</p> <pre>Router# configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)# cable load-balance modem max-failures 10 Router(config)#</pre> |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

# cable load-balance restrict modem

To configure a list of cable modems statically provisioned at the CMTS, to a restricted load balancing group (RLBG) or a service type ID, use the **cable load-balance restrict modem** command in the global configuration mode. To remove the configured list of cable modems, use the **no** form of this command.

```
cable load-balance restrict modem index mac-addr [mac-mask] {docsis-group docsis-group-id | service-type-id string}
```

```
no cable load-balance restrict modem index mac-addr [mac-mask] {docsis-group docsis-group-id | service-type-id string}
```

## Syntax Description

|                                               |                                                            |
|-----------------------------------------------|------------------------------------------------------------|
| <i>index</i>                                  | Assigns an index number ranging from 1 to 4294967295.      |
| <i>mac-addr</i>                               | Specifies the MAC address of the modem that is restricted. |
| <i>mac-mask</i>                               | Specifies the MAC mask of the modem that is restricted.    |
| <b>docsis-group</b><br><i>docsis-group-id</i> | Restricts modems to a DOCSIS load balancing group.         |
| <b>service-type-id</b> <i>string</i>          | Restricts modems to a service type ID.                     |

## Command Default

No default behavior or values.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Examples

The following example shows how to assign a group of modems with a common MAC mask to a group or a service type ID using the **cable load-balance restrict modem** command. To assign the modem to a LBG, you can either specify the LBG ID or the service type ID.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance restrict modem 1 001a.c30c.7eee FFFF.FFFF.0000
docsis-group 100
Router(config)#
```

# cable load-balance rule

To create a rule that prevents cable modem (CM) from disabling or enabling load balancing, use the **cable load-balance rule** command in cable global configuration mode. To remove a defined rule, a rule from all policies, or the policy itself if it is the last rule of that policy, use the **no** form of this command.

```
cable load-balance rule rule-id {disable-period {dis-start start-time dis-period disable-period}
| disable-throughput-lowerbound {ds n | us n} | disabled | enabled | vdoc-enabled}
```

```
no cable load-balance rule rule-id
```

|                           |                                         |                                                                                                                                            |
|---------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>rule-id</i>                          | Specifies the rule to load balance CM.                                                                                                     |
|                           | <b>disable-period</b>                   | Specifies the number of seconds to prevent CM from load balancing at a given start time.                                                   |
|                           | <b>dis-start</b> <i>start-time</i>      | Specifies the start time to disable CM from load balancing. The dis-start is the start time ranging from 0 to 86400 seconds from midnight. |
|                           | <b>dis-period</b> <i>disable period</i> | Specifies the period to disable CM from load balancing. The dis-period is the duration time ranging from 0 to 86400 seconds from midnight. |
|                           | <b>disable-throughput-lowerbound</b>    | Disables load balancing if CM throughput is lower than a threshold.                                                                        |
|                           | <b>ds</b> <i>n</i>   <b>us</b> <i>n</i> | Specifies downstream or upstream channels throughput lowerbound in kbps, ranging from 0 to 1000000.                                        |
|                           | <b>disabled</b>                         | Disables the CM from load balancing.                                                                                                       |
|                           | <b>enabled</b>                          | Enables load balancing on CM.                                                                                                              |
|                           | <b>vdoc-enabled</b>                     | Enables the video over DOCSIS (VDOC) load balancing for static multicast groups.                                                           |

**Command Default** No default behavior or values for this command

**Command Modes** Global configuration (config)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                          |
|------------------------|----------------|------------------------------------------------------------------------------|
|                        | 12.2(33)SCB    | This command was introduced.                                                 |
|                        | 12.2(33)SCC    | The <b>disable-throughput-lowerbound</b> parameter was added in the command. |
|                        | 12.2(33)SCD5   | The <b>vdoc-enabled</b> parameter was added in the command.                  |

**Usage Guidelines** The **no** form of this command supports the following actions:

- Remove a defined rule.
- Remove the rule from all policies.
- Remove the policy itself if it is the last rule of that policy.



**Note**

Static multicast groups must be configured on the specific bundle interface as well as on the correct forwarding interfaces to enable the **vdoc-enabled** rule.

**Examples**

The following example shows how to create a rule:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance rule 1 disable-period dis-start 40 dis-period 50
Router(config)# cable load-balance rule 1 disable-throughput-lowerbound ds 2500
Router(config)# cable load-balance rule 1 disabled
Router(config)# cable load-balance rule 2 enabled
Router(config)# cable load-balance rule 1 vdoc-enabled
Router(config)#
```

**Related Commands**

| Command                                 | Description                                                                    |
|-----------------------------------------|--------------------------------------------------------------------------------|
| <b>cable load-balance docsis-policy</b> | Creates a DOCSIS policy and associates a new or existing rule with the policy. |

# cable logging badipsource

To log error messages about bad IP source addresses on the cable interfaces to a separate log buffer, use the **cable logging badipsource** command in global configuration mode. To turn off the logging function and clear out the buffer, so that any error messages are logged to the console or current system log, use the **no** form of this command.

**cable logging badipsource** [*buffer-size*]

**no cable logging badipsource**

## Syntax Description

*buffer-size* Specifies the total size of the buffer that will contain the logged error messages. The valid range is 4096 to 1048576 bytes (4 KB to 1 MB), with a default value of 4096 bytes.

**Note** The maximum buffer size is limited by the amount of actual unused memory that is available on the Cisco CMTS.

## Command Default

By default, error messages for bad IP source addresses are logged to the console or current system log. The default logging buffer size is 4096 entries.

## Command Modes

Global configuration

## Command History

| Release                 | Modification                                                                                                                                                                                                                                               |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(13)EC              | This command was introduced for the Cisco uBR7100 series and Cisco uBR7200 series universal broadband routers.                                                                                                                                             |
| 12.2(11)CY              | Support was added for the Cisco uBR10012 universal broadband router.                                                                                                                                                                                       |
| 12.2(11)BC2             | Support was added to the Release 12.2 BC train for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers.                                                                                                                             |
| 12.2(15)BC1, 12.2(15)CX | The maximum buffer size was adjusted to 1 MB, which can contain approximately 2000 error messages. Also, if the requested amount of memory is not available in a contiguous block, the CMTS displays an error message and does not change the buffer size. |

## Usage Guidelines

The **cable source-verify** command enables service providers to verify that the IP addresses being used on the cable interface have been properly assigned by the provider's DHCP servers. When a bad IP address is detected, the Cisco CMTS generates a BADIPSOURCE error message in the console logs.

In previous Cisco IOS releases, the Cisco CMTS generated these particular error messages for every IP packet that contained a bad IP source address. This can create a large volume of error messages that can make it difficult to see other error messages in the console logs.

To create a separate log for these error messages, use the **cable logging badipsource** command. You can also specify the size of the buffer that will contain these error messages. When the buffer becomes full, the oldest messages are deleted to make room for newer messages, so choose a buffer size that will allow you to retain all messages until you can examine them.

On the Cisco uBR10012 router, this command includes only the BADIPSOURCE error messages generated by the PRE module. The cable interface line cards also generate their own error messages, but because these error messages are typically duplicates of the ones generated by the PRE module, they are not included in the separate log.

**Tip**

If you find that the current buffer is too small to contain the current volume of error log messages, you can issue this command again with a larger buffer size. However, doing so will automatically clear out all messages currently in the buffer, so be certain that you have viewed all of the current messages before giving a second **cable logging badipsource** command.

**Note**

Be cautious when specifying the buffer size, because the Cisco CMTS could run out of memory for other tasks. Use the **show memory EXEC** command to display the maximum available processor memory, and set the buffer size for this command to a value well within that maximum value.

To display the contents of this error log, use the **show cable logging** command. To clear the buffer after you have viewed the error messages, use the **clear cable logging** command. You can also use the **service timestamps log** command to add a timestamp to the messages in the log.

To print the BADIPSOURCE messages to the console or syslog server, use the **no cable logging badipsource** command (which is the default configuration). Note that this configuration does not turn off the generation of BADIPSOURCE messages, but only configures the system for the default log message behavior.

**Tip**

If you do not want to see any BADIPSOURCE messages at all, use the **cable logging badipsource 4096** command so that these messages go to a separate buffer with the smallest possible size. You will then not see these error messages unless you explicitly use the **show cable logging** command to display them.

## Examples

The following example shows how to enable the logging of bad IP source address error messages, using a buffer size of 524,288 bytes (512 KB):

```
Router# configure terminal
Router(config)# cable logging badipsource 524288
Router(config)#
```

**Tip**

You must also use the **cable source-verify** command to enable verification of source IP addresses before the buffer will contain any error messages about bad IP source addresses. If you do not use the **cable source-verify** command, you can still use the **cable logging badipsource** command to create a buffer, but the buffer will always remain empty.

The following example shows how to enlarge the current buffer for bad IP source address error messages by giving the **cable logging badipsource** command a second time. Because this will empty out the buffer of all current messages, be sure to display the current buffer contents before giving the command a second time.

```
Router# configure terminal
Router(config)# cable logging badipsource 8192
Router(config)# exit
Router# show cable logging badipsource
```

<<buffer contents omitted>>

```
Router# configure terminal
Router(config)# cable logging badipsource 256000
```

The following example shows how to stop the logging of bad IP source address error messages to a separate buffer. This clears out all error messages from the buffer and removes the buffer from memory, and future error messages for bad IP source addresses are logged to the console or to the current system log, if any.

```
Router# configure terminal
Router(config)# no cable logging badipsource
Router(config)#
```

|                         |                            |                                                                                                             |
|-------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>cable source-verify</b> | Enables verification of IP addresses for CMs and CPE devices on the upstream.                               |
|                         | <b>clear cable logging</b> | Removes all error messages about bad IP source addresses on the cable interfaces from the error log buffer. |
|                         | <b>show cable logging</b>  | Displays the log of error messages about bad IP source addresses on the cable interfaces.                   |

# cable logging downstream-index

To enable logging for downstream indexes, use the **cable logging downstream-index** command in global configuration mode. To turn off logging and clear the buffer, use the **no** form of this command.

**cable logging downstream-index** [*buffer-size*]

**no cable logging downstream-index** [*buffer-size*]

## Syntax Description

|                    |                                                                                                                                                          |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>buffer-size</i> | Total size of the buffer that contains the logged downstream indexes. The valid range is from 4096 to 4121440 bytes, with a default value of 4096 bytes. |
| <b>Note</b>        | The maximum buffer size is limited by the amount of actual unused memory that is available on the Cisco CMTS.                                            |

## Command Default

By default, the downstream indexes are logged on the line card on which this configuration is enabled.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCG | This command was introduced. |

## Usage Guidelines

The **cable logging downstream-index** command is configured on the Cisco uBR-MC3GX60V or Cisco UBR-MC20X20V cable line cards or on the line card that is configured to be the modular-host for a SPA. The downstream index logging may be enabled on the cable line card that has the MAC domain.



### Note

This command is used to collect data only when requested by Cisco TAC.



### Caution

Be cautious when specifying the buffer size because the Cisco CMTS could run out of memory for other tasks. Use the **show memory EXEC** command to display the maximum available processor memory, and set the buffer size for this command to a value well within the maximum value.

To display the contents of the downstream index log, use the **show cable logging downstream-index** command. To clear the buffer after you have viewed the log, use the **clear cable logging downstream-index** command. You can also use the **service timestamps log** command to add a timestamp to the messages in the log.

Examples

The following example shows how to enable downstream index logging:

```
Router> enable
Router# conf t
Router(config)# cable logging downstream-index 4096
```

Related Commands

| Command             | Description                                |
|---------------------|--------------------------------------------|
| clear cable logging | Removes all downstream index log messages. |
| show cable logging  | Displays all downstream index log messages |

# cable logging layer2events

To save selected (low priority) DOCSIS events that are specified in CMTS MIB Registry to the cable logging buffer (instead of to the general logging buffer), use the **cable logging layer2events** command in global configuration mode. To disable the logging of DOCSIS events to the cable logging buffer, use the **no** form of this command.

**cable logging layer2events**

**no cable logging layer2events**

## Syntax Description

This command has no additional arguments or keywords.

## Command Default

By default, the DOCSIS events are saved to the general logging buffer on the Cisco CMTS. The default logging buffer size is 4096 entries.

## Command Modes

Global configuration mode

## Command History

| Release    | Modification                                                                                        |
|------------|-----------------------------------------------------------------------------------------------------|
| 12.3(9a)BC | This command was introduced on the Cisco uBR10012 and Cisco uBR7246VXR universal broadband routers. |

## Usage Guidelines

Use the **show cable logging** command to check whether the logging feature is enabled and the status of the logging buffer.

## Examples

The following example shows how to clear the log buffer that contains a bad IP source address error messages:

```
Router# show cable logging summary
```

```
Cable logging: BADIPSOURCE Enabled
Total buffer size (bytes): 1000000
Used buffer size (bytes) : 36968
Logged messages : 231
```

```
Router# clear cable logging badipsource
```

```
Router# show cable logging summary
```

```
Cable logging: BADIPSOURCE Enabled
Total buffer size (bytes): 1000000
Used buffer size (bytes) : 0
Logged messages : 0
```

| Related Commands | Command                          | Description                                                                                         |
|------------------|----------------------------------|-----------------------------------------------------------------------------------------------------|
|                  | <b>cable logging badipsource</b> | Logs error messages about bad IP source addresses on the cable interfaces to a separate log buffer, |
|                  | <b>show cable logging</b>        | Indicates whether the logging feature is enabled and the status of the logging buffer.              |









# Cable Commands: cable m to n

Revised: August 12, 2013, OL-15510-17

## New Commands

| Command                                    | Cisco IOS Software Release |
|--------------------------------------------|----------------------------|
| cable modem service-class-name             | 12.3(23)BC2                |
| cable multicast group-encryption           | 12.2(33)SCA                |
| cable multicast group-qos                  | 12.2(33)SCA                |
| cable multicast qos group                  | 12.2(33)SCA                |
| cable multicast auth enable default-action | 12.2(33)SCB                |
| cable multicast auth profile-name          | 12.2(33)SCB                |
| cable modulation-profile global-scheme     | 12.2(33)SCC                |
| cable mrc-mode                             | 12.2(33)SCC                |
| cable mtc-mode                             | 12.2(33)SCC                |
| cable nd                                   | 12.2(33)SCC                |
| cable multicast group-qos default          | 12.2(33)SCC1               |
| cable metering ipdr                        | 12.2(33)SCD2               |
| cable metering ipdr-d3                     | 12.2(33)SCD2               |
| cable multicast mdf-disable                | 12.2(33)SCD3               |
| cable multicast source                     | 12.2(33)SCE                |
| cable multicast ses-cache                  | 12.2(33)SCH                |
| cable modem v6-max-cpe-prefix              | 12.2(33)SCH1               |

## Modified Commands

| Command                           | Cisco IOS Software Release |
|-----------------------------------|----------------------------|
| cable modem remote-query          | 12.3(23)BC                 |
| cable modem service-class-name    | 12.2(33)SCB                |
| cable multicast auth profile-name | 12.2(33)SCC                |

| Command                            | Cisco IOS Software Release |
|------------------------------------|----------------------------|
| <b>cable metering destination</b>  | 12.2(33)SCD2               |
| <b>cable metering filesystem</b>   | 12.2(33)SCD2               |
| <b>cable modem remote-query</b>    | 12.2(33)SCD5               |
| <b>cable monitor</b>               | 12.2(33)SCE                |
| <b>cable multicast mdf-disable</b> | 12.2(33)SCE4               |
| <b>cable multicast mdf-disable</b> | 12.2(33)SCF2               |
| <b>cable metering ipdr</b>         | 12.2(33)SCG                |
| <b>cable metering ipdr-d3</b>      | 12.2(33)SCG                |

# cable map-advance

To configure the dynamic map advance algorithm, use the **cable map-advance** command in cable interface configuration mode. Use the **no** form of this command to disable this function.

**cable map-advance** [**dynamic** [*safety*] | **static**] [*max-delay*]

**no cable map-advance**

| Syntax Description           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dynamic</b> <i>safety</i> |  | Enables the dynamic MAP advance algorithm that automatically tunes lookahead time in MAPs based on the current farthest CM on a particular upstream port. The <i>safety</i> argument specifies a safety factor for the dynamic map advance algorithm in microseconds. This value controls the amount of extra lookahead time in MAPs to account for inaccuracies of the measurement system and internal software latencies. The valid range is 300 to 1500 microseconds, with a default of 1000. |
|                              |  | <b>Note</b> Using larger safety factors increases the run time lookahead in MAPs, but reduces the upstream performance.                                                                                                                                                                                                                                                                                                                                                                          |
| <b>static</b>                |  | Enables the static map advance algorithm that uses a fixed lookahead time value in MAPs based on the worst-case propagation delay of 100 mile HFC cable network.                                                                                                                                                                                                                                                                                                                                 |
| <i>max-delay</i>             |  | Specifies the maximum round trip delay between the cable plant and furthest CM in microseconds. The valid range is 100 to 2000 microseconds, with a default of 1800. The typical delay for a mile of coaxial cable is approximately 7 microseconds. The typical delay for a mile of fiber cable is approximately 8 microseconds.                                                                                                                                                                 |

**Defaults** Dynamic map advance with a *safety* factor of 1000 microseconds and a *max-delay* of 1800 microseconds

**Command Modes** Interface configuration (cable interface only)

| Command History | Release               | Modification                                                                                                                                                                                                              |
|-----------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1T                 | This command was introduced.                                                                                                                                                                                              |
|                 | 12.0(9)SC, 12.1(2)EC1 | The <b>dynamic</b> option was added.                                                                                                                                                                                      |
|                 | 12.1(10)EC            | The <i>max-delay</i> option was added. The dynamic MAP algorithm was also enhanced so that it can quickly determine whether the furthest CM is now offline, so that the MAP advance algorithm can be updated accordingly. |
|                 | 12.2(8)BC1            | The range for the <i>max-delay</i> option was changed to the current values of between 100 and 2000 microseconds.                                                                                                         |

---

**Usage Guidelines**

The *max-delay* option, which was introduced in Cisco IOS Release 12.1(10)EC, specifies the maximum possible round-trip delay between the cable plant and furthest CM in the cable network. A CM will not be allowed to exceed the maximum timing offset given by the *max-delay* value (in **static** mode) or given by the combination of the *max-delay* and *safety* values (in **dynamic** mode). If a CM reports a timing offset beyond the maximum value, the CMTS will reset its offset to the maximum value and put an exclamation point (!) next to its offset value in the **show cable modem** display.

In dynamic MAP operation, Cisco IOS 12.1(10)EC also implements a regular polling of the furthest CM, to determine if that CM is now offline. If the furthest CM has gone offline, the CMTS scans the currently online CMs to determine which CM is now the furthest offline and updates the dynamic MAP advance algorithm with the new value.

---

**Examples**

The following example shows how to configure the dynamic map advance to 1500 microseconds:

```
router(config-if)# cable map-advance dynamic 1500
```

---

**Related Commands**

---

|                         |                                            |
|-------------------------|--------------------------------------------|
| <b>show cable modem</b> | Displays statistics for the connected CMs. |
|-------------------------|--------------------------------------------|

---

# cable match address

To specify that IP multicast streams be encrypted, use the **cable match address** command in cable interface configuration mode. To specify that multicast streams should not be encrypted, use the **no** form of this command.

**cable match address** *access-list*

**no cable match address**

## Syntax Description

*access-list* Specifies that the IP multicast streams defined by the access list be encrypted. Access lists can be IP access list numbers or an IP access list name. Valid access list numbers are from 100 to 199.

## Command Default

No default behavior or values

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.1 T      | This command was introduced.                                                                                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The **cable match address** command binds an access-list to a cable interface, allowing multicast encryption to be performed on traffic through that interface. To configure the access list, use the **ip access-list** command.



### Note

This command is not available for cable subinterfaces.

For additional information on configuring for multicast operations, see the chapters on IP Multicast in the *Release 12.2 Cisco IOS IP Configuration Guide* and in Volume 3 of the *Cisco IOS IP Command Reference*.



### Note

This command is available only on images that support Baseline Privacy Interface (BPI) and Baseline Privacy Interface Plus (BPI+) encryption.

## Examples

The following example shows how to specify that the multicast stream defined by the access list named **reno** be encrypted on cable interface 3/0:

```
Router(config)# interface c3/0
```

**cable match address**

```
Router(config-if)# cable match address reno
```

The following example shows how to specify that the multicast stream defined by the access list number 102 be encrypted:

```
Router(config)# interface c3/0
Router(config-if)# cable match address 102
```

**Related Commands**

| Command               | Description                        |
|-----------------------|------------------------------------|
| <b>ip access-list</b> | Defines an IP access list by name. |



# cable max-hosts

To specify the maximum number of hosts that can be attached to a subscriber's CM, use the **cable max-hosts** command in cable interface configuration mode. Use the **no** form of this command to reset the allowable number of hosts attached to a CM to the default value of 0 hosts.

**cable max-hosts** *n*

**no cable max-hosts**

## Syntax Description

*n* Specify the maximum number of hosts that can be attached to a CM on this interface. Valid range is from 0 to 255 hosts. Default value is 0.

## Command Default

0

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release               | Modification                                                           |
|-----------------------|------------------------------------------------------------------------|
| 12.0(4)XI             | This command was introduced.                                           |
| 12.0(6)SC, 12.1(2)EC1 | Support was added on the Cisco IOS 12.0 SC and 12.1 EC release trains. |

## Usage Guidelines

The Cisco CMTS uses three commands set the maximum number of hosts for a particular CM, for all CMs on a particular cable interface, or for all CMs using the Cisco CMTS router:

- **cable modem max-hosts**—Sets the maximum number of hosts for a particular CM.
- **cable max-hosts**—Sets the maximum number of hosts for all CMs on a particular cable interface.
- **cable modem max-cpe**—Sets the maximum number of hosts for all CMs using the Cisco CMTS router.

The more specific commands override the settings of the less specific commands. For example, if you use the **cable modem max-cpe** command to set the maximum number of hosts to 2 for all CMs, you can still use the **cable modem max-hosts** command to give a particular CM a larger maximum host value.



### Note

The CMTS assigns the MAX Host value to a cable modem at the time that the cable modem registers with the CMTS. Changing any of the MAX Host commands affects only cable modems that register after the change.



### Tip

For more information on how these commands interact to set the maximum CPE values, see the chapter *Maximum CPE or Host Parameters for the Cisco Cable Modem Termination System* in the *Cisco CMTS Feature Guide*, available on Cisco.com and the Documentation CD-ROM.

---

**Examples**

The following example shows how to set the maximum hosts for CMs on this particular cable interface to 15:

```
Router(config)# interface c6/0
Router(config-if)# cable max-hosts 15
```

---

**Related Commands**

| Command                             | Description                                                               |
|-------------------------------------|---------------------------------------------------------------------------|
| <b>cable modem access-group</b>     | Specifies an access group for a CM.                                       |
| <b>cable modem change-frequency</b> | Changes the downstream frequency or upstream channel ID.                  |
| <b>cable modem max-cpe</b>          | Sets the maximum number of hosts for all CMs using the Cisco CMTS router. |
| <b>cable modem max-hosts</b>        | Sets the maximum number of hosts for a particular CM.                     |
| <b>show cable modem</b>             | Displays CM configuration settings.                                       |

# cable metering data-per-session

To view the number of cable metering data flows per session for a cable modem termination system, use the **cable metering data-per-session** command in the global configuration mode. To disable this feature, use the **no** form of this command.

**cable metering data-per-session** *data-per-session* **timer** *timer value*

**no cable metering data-per-session** *data-per-session* **timer** *timer value*

## Syntax Description

|                         |                                                                                                   |
|-------------------------|---------------------------------------------------------------------------------------------------|
| <i>data-per-session</i> | The number of data flows per session. The range is from 3 to 30. The default is 5.                |
| <b>timer</b>            | Displays the cable line card timer to wake up.                                                    |
| <i>timer value</i>      | The timer wake up interval value in milliseconds. The range is from 8 to 500. The default is 100. |

## Command Default

The cable metering data flow values will not be visible.

## Command Modes

Global configuration mode

## Command History

| Release      | Modification                                                    |
|--------------|-----------------------------------------------------------------|
| 12.2(33)SCB1 | This command was introduced.                                    |
| 12.3(23)BC7  | This command was integrated into Cisco IOS Release 12.3(23)BC7. |

## Usage Guidelines

The **cable metering data-per-session** command allows users to view the number of cable metering data flows per session. The command limits or throttles the data collection between the cable line card and the route processor.

## Examples

The following example displays the number of cable metering data flows per session:

```
Router#configure terminal
Router(config)#cable metering data-per-session 8 timer 100
Router#show run | inc metering
cable metering destination 2.7.36.88 6789 0 15 non-secure
cable metering data-per-session 8 timer 100
```

## Related Commands

| Command                           | Description                                                                                     |
|-----------------------------------|-------------------------------------------------------------------------------------------------|
| <b>show cable metering-status</b> | Displays information about the most recent successful usage-based billing operation.            |
| <b>cable metering destination</b> | Enables usage-based billing and to stream the billing records to an external collection server, |

# cable metering destination

To enable usage-based billing and to stream the billing records to an external collection server, use the **cable metering destination** command in global configuration mode. To disable usage-based billing, use the **no** form of this command.

**cable metering destination** *ip-address port* [*ip-address2 port2*] *retries minutes* {**non-secure** | **secure**} [**cpe-list-suppress**] [**flow-aggregate**] [**full-records**]

**no cable metering**

| Syntax Description       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address port</i>   | Address and TCP port number for the billing application on the external server: <ul style="list-style-type: none"> <li><i>ip-address</i>—IP address for the external collection server.</li> <li><i>port</i>—TCP port number for the billing collection application on the server. The valid range is from 0 to 65535, but the port should not be one of the widely-used TCP port numbers (0 to 1024).</li> </ul>                                                                                    |
| <i>ip-address2 port2</i> | (Optional) IP address and TCP port number for a billing application on a secondary external server that is used if the primary server fails to respond: <ul style="list-style-type: none"> <li><i>ip-address2</i>—IP address for the secondary external server.</li> <li><i>port2</i>—TCP port number for the billing collection application on the secondary server. The valid range is from 0 to 65535, but the port should not be one of the widely-used TCP port numbers (0 to 1024).</li> </ul> |
| <i>retries</i>           | Number of retry attempts that the Cisco CMTS makes to establish a secure connection with the external server before using the secondary server (if configured) and sending an SNMP trap about the failure. The valid range for <i>n</i> is from 0 to 5, with a default of 1 retry attempt.                                                                                                                                                                                                           |
| <i>minutes</i>           | Frequency of the billing records streamed to the external server. The valid range is 2 to 1440 minutes (24 hours), with no default.<br><b>Note</b> We recommend a minimum interval of 30 minutes.                                                                                                                                                                                                                                                                                                    |
| <b>non-secure</b>        | Specifies that the Cisco CMTS should use an unencrypted TCP connection when connecting with the billing application on the external server.                                                                                                                                                                                                                                                                                                                                                          |
| <b>secure</b>            | Specifies that the Cisco CMTS should use a secure socket layer (SSL) TCP connection when connecting with the billing application on the external server.<br><b>Note</b> This option is available only on the Cisco CMTS software images that support Baseline Privacy Interface (BPI) encryption.                                                                                                                                                                                                    |
| <b>cpe-list-suppress</b> | (Optional) Eliminates the customer premises equipment (CPE) IP addresses from the billing records to improve performance.<br><b>Note</b> The default is for CPE addresses to be included in the billing record, up to a maximum of five CPE IP addresses for each cable modem.                                                                                                                                                                                                                       |
| <b>flow-aggregate</b>    | (Optional) Combines all information for an individual cable modem into one record. Separate counters are maintained for upstream and downstream traffic, but those counters include all service flows in that direction.                                                                                                                                                                                                                                                                             |
| <b>full-records</b>      | (Optional) Provides information about full service flow (active and idle) records.                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Command Default** Usage-based billing is disabled, by default. When enabled, CPE IP addresses (a maximum of five per cable modem) are included in the billing records by default.

**Command Modes** Global configuration (config)

| Command History | Release      | Modification                                                                                                                                                                                                                                                                               |
|-----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(9a)BC   | This command was introduced.                                                                                                                                                                                                                                                               |
|                 | <b>Note</b>  | In Cisco IOS Release 12.3(9a)BC, this command supports the monitoring of all service flows for DOCSIS 1.0, DOCSIS 1.1, and DOCSIS 2.0 cable modems: <ul style="list-style-type: none"> <li>• upstream and downstream</li> <li>• primary</li> <li>• secondary</li> <li>• dynamic</li> </ul> |
|                 | 12.2(33)SCD2 | This command was modified to add the <b>full-records</b> keyword.                                                                                                                                                                                                                          |
|                 | <b>Note</b>  | In Cisco IOS Release 12.2(33)SCD2 and later releases, this command is also supported on DOCSIS 3.0 cable modems.                                                                                                                                                                           |

**Usage Guidelines** The **cable metering destination** command enables usage-based filling and configures it for streaming mode, where the Cisco CMTS creates the billing records and regularly sends them to an external server for use by the billing application.

The Cisco CMTS attempts to establish a connection with the first (primary) external server, and if this fails, the CMTS sends an SNMP trap about the failure. The Cisco CMTS retries the connection for the number of times specified in the **cable metering destination** command, and if all of those attempts fail, the Cisco CMTS switches to the secondary external server, if configured. The Cisco CMTS repeats this sequence at every interval, and always tries to connect to the primary server first before attempting to use the secondary server.



**Note** You can enable usage-based billing using either the **cable metering filesystem** or **cable metering destination** command, but not both. If you give these commands twice, the second command will overwrite the first.

If the CMTS cannot transmit the billing record to the external server, and if metering traps have been enabled using the **snmp-server enable traps cable metering** command, the CMTS sends an SNMP trap to the SNMP manager describing the reason for the failure. Typically, the reason is either that a timeout occurred with the external server, or that the billing record no longer exists on the local filesystem. An SNMP trap is sent for each connection failure.

To disable usage-based billing, use the **no cable metering** command. This immediately stops the collection of billing information, except when the billing records are currently being streamed to the external server. If a billing operation is in progress when you give the **no cable metering** command, the system displays the message “CMTS Metering in progress. Ignoring current config.” Wait until the billing operation is finished and then reenter the **no cable metering** command.

**Note**

If the **show cable metering-status** command displays the status of a streaming operation as “success” but the records were not received on the billing application server, verify that the Cisco CMTS and server are configured for the same type of communications (non-secure TCP or secure SSL). If the Cisco CMTS is configured for non-secure TCP and the server is configured for secure SSL, the Cisco CMTS transmits the billing record successfully, but the server discards all of the data, because it did not arrive in a secure SSL stream.

**Examples**

The following example shows how to enable usage-based billing for streaming mode, with the CMTS transmitting the billing records every 60 minutes to the server at the IP address of 10.10.10.37 and TCP port of 5215, using a secure socket layer (SSL) TCP connection. A secondary external service is also defined. The CMTS will retry the connection three times before giving up and switching to the secondary server, as well as sending an SNMPv3 trap to notify the SNMP management system of the failure:

```
U7246VXR# configure terminal
U7246VXR(config)# cable metering destination 10.10.10.37 5215 10.10.10.41 5215 3 60 secure
U7246VXR(config)#
```

The following example shows how to enable usage-based billing for streaming mode, with the CMTS transmitting the billing records every 30 minutes to the server at the IP address of 10.10.10.37 and TCP port of 8181, using an unencrypted TCP connection. No secondary server is defined. The CMTS will retry the connection only once before giving up and sending an SNMPv3 trap to notify the SNMP management system of the failure:

```
Router# configure terminal
Router(config)# cable metering destination 10.10.10.37 8181 1 30 non-secure
Router(config)#
```

The following example shows how to enable usage-based billing, using the same configuration as above, except that the billing records do not include the IP addresses for the CPE devices:

```
Router# configure terminal
Router(config)# cable metering destination 10.10.10.37 8181 1 30 non-secure
cpe-list-suppress
Router(config)#
```

The following example shows how to enable usage-based billing, using an unencrypted TCP connection, including the IP addresses for the CPE devices, and enabling the **full-records** option:

```
Router# configure terminal
Router(config)# cable metering destination 10.10.10.37 11 1 222 non-secure full-records
cpe-list-suppress
Router#
```

**Related Commands**

| Command                                | Description                                                                                  |
|----------------------------------------|----------------------------------------------------------------------------------------------|
| <b>cable metering filesystem</b>       | Enables usage-based billing and writes the billing records to a file on a local file system. |
| <b>cable metering ipdr</b>             | Enables usage-based billing using the IPDR and SP2.1 protocol.                               |
| <b>cable metering ipdr-d3</b>          | Enables usage-based billing on DOCSIS 3.0 cable modems.                                      |
| <b>cable metering source-interface</b> | Enables debugging of usage-based billing operations.                                         |

|                                       |                                                                                                     |
|---------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>show cable metering-status</b>     | Displays information about the most recent usage-based billing operation.                           |
| <b>snmp-server enable traps cable</b> | Ensures that the Simple Network Management Protocol (SNMP) traps are sent for cable-related events. |

# cable metering filesystem

To enable usage-based billing and to write the records to a file on a local file system, use the **cable metering filesystem** command in global configuration mode. To disable usage-based billing, use the **no** form of this command.

**cable metering filesystem** *filesystem* [**cpe-list-suppress**] [**flow-aggregate**] [**full-records**]

**no cable metering**

|                    |                          |                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>filesystem</i>        | File system where the billing record file is written. The <i>filesys</i> parameter has a maximum length of 25 characters and must specify a valid file system on the router (such as slot0, disk1, or flash).<br><br><b>Note</b> The system will write the billing records to this file system using a file name that contains the hostname of the router followed by a timestamp when the record was written. |
|                    | <b>cpe-list-suppress</b> | (Optional) Eliminates the customer premises equipment (CPE) IP addresses from the billing records to improve performance.<br><br><b>Note</b> If this option is not selected, a maximum of five CPE IP addresses are included in the billing record for each cable modem.                                                                                                                                       |
|                    | <b>flow-aggregate</b>    | (Optional) Combines all information for an individual cable modem into one record. Separate counters are maintained for upstream and downstream traffic, but those counters include all service flows in that direction.                                                                                                                                                                                       |
|                    | <b>full-records</b>      | (Optional) Provides information about full service flow (active and idle) records.                                                                                                                                                                                                                                                                                                                             |

|                 |                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command Default | Usage-based billing is disabled, by default. When usage-based billing is enabled, CPE IP addresses (a maximum of five) are included in the billing records by default. |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|



| Command History | Release      | Modification                                                                                                                                                                                                                                                                                                                 |
|-----------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(9a)BC   | This command was introduced.<br><br><b>Note</b> In Cisco IOS Release 12.3(9a)BC, this command supports the monitoring of all service flows for DOCSIS 1.0, 1.1, and 2.0 cable modems: <ul style="list-style-type: none"> <li>– upstream and downstream</li> <li>– primary</li> <li>– secondary</li> <li>– dynamic</li> </ul> |
|                 | 12.2(33)SCD2 | This command was modified to add the <b>full-records</b> keyword.<br><br><b>Note</b> In Cisco IOS Release 12.2(33)SCD2 and later releases, this command is also supported on the DOCSIS 3.0 cable modems.                                                                                                                    |

### Usage Guidelines

The **cable metering filesystem** command enables usage-based filling and configures it for file mode, where the CMTS writes the billing records to the local file system. The system writes the billing record to the filesystem specified by this command, using a file name that consists of the router's hostname followed by a timestamp for when the file was created.

When the CMTS writes a billing record, it can also optionally send an SNMPv3 trap to notify the billing application that a billing record is available for pickup. The billing application can then log into the Cisco CMTS and use the File Transfer Protocol (FTP) or Secure Copy (SCP) to pick up the file.



#### Note

You can enable usage-based billing using either the **cable metering filesystem** or **cable metering destination** command, but not both. If you give these commands twice, the second command will overwrite the first.

If the CMTS cannot write the billing record to the local filesystem, and if metering traps have been enabled using the **snmp-server enable traps cable metering** command, the CMTS sends an SNMP trap to the SNMP manager describing the reason for the failure. Typically, the reason is either that the disk is full or that an disk error occurred (such as no PCMCIA card in the slot).

To disable usage-based billing, use the **no cable metering** command. This immediately stops the collection of billing information, except when the billing records are currently being written to the local file system. If a billing operation is in progress when you give the **no cable metering** command, the system displays the message "CMTS Metering in progress. Ignoring current config." Wait until the billing operation is finished and then reenter the **no cable metering** command.

### Examples

The following example shows how to enable usage-based billing, writing the records to a file on the disk0: device.

```
U7246VXR# configure terminal
U7246VXR(config)# cable metering filesystem disk0:
U7246VXR(config)#
```

**Note**

Do not use **nvr** as the file system. For example, do not use:

```
Router(config)# cable metering filesystem nvr:
```

The following example shows how to enable usage-based billing, writing the records to files on the disk2 device on an NPE-G1 processor:

```
Router# configure terminal
Router(config)# cable metering filesystem disk2:
Router(config)#
```

The following example shows how to enable usage-based billing, writing the records to files in Flash Memory. The IP addresses for the CPE devices are not included in the billing records.

```
Router# configure terminal
Router(config)# cable metering filesystem flash: cpe-list-suppress
Router(config)#
```

The following example shows how to enable usage-based billing, writing the records to files in Flash Memory, and enabling the full-records option:

```
Router# configure terminal
Router(config)# cable metering filesystem disk2:xyz full-records
Router#
```

**Related Commands**

| Command                                | Description                                                                                      |
|----------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable metering destination</b>      | Enables usage-based billing and streams the billing records to an external server.               |
| <b>cable metering ipdr</b>             | Enables usage-based billing using the IPDR and SP2.1 protocol.                                   |
| <b>cable metering ipdr-d3</b>          | Enables usage-based billing on DOCSIS 3.0 cable modems.                                          |
| <b>cable metering source-interface</b> | Enables debugging of usage-based billing operations.                                             |
| <b>show cable metering-status</b>      | Displays information about the most recent usage-based billing operation.                        |
| <b>snmp-server enable traps cable</b>  | Enables the sending of Simple Network Management Protocol (SNMP) traps for cable-related events. |

# cable metering ipdr

To configure the Subscriber Account Management Interface Specification (SAMIS) and to enable usage-based billing on DOCSIS 2.0 cable modems, use the **cable metering ipdr** command in global configuration mode. To disable usage-based billing, use the **no** form of this command.

**cable metering ipdr** *interval* *session session-id* [**flow-aggregate**] [**full-records**]

**no cable metering**

## Syntax Description

|                                  |                                                                                                                                                                                                                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>interval</i>                  | Metering data streaming interval in minutes. The valid range is from 2 to 1440 minutes (24 hours).                                                                                                                       |
| <b>session</b> <i>session id</i> | IP Detail Records (IPDR) session ID. The valid session ID range is from 1 to 255.                                                                                                                                        |
| <b>flow-aggregate</b>            | (Optional) Combines all information for an individual cable modem into one record. Separate counters are maintained for upstream and downstream traffic, but those counters include all service flows in that direction. |
| <b>full-records</b>              | (Optional) Provides information about full service flow (active and idle) records.                                                                                                                                       |

## Command Default

Usage-based billing is disabled, by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                                                                                                                                                             |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA  | This command was introduced.<br><br><b>Note</b> In Cisco IOS Release 12.2(33)SCA, this command is supported on DOCSIS 1.0, DOCSIS 1.1, and DOCSIS 2.0 cable modems.                                      |
| 12.2(33)SCD2 | The command was modified to include the <b>full-records</b> keyword.<br><br><b>Note</b> In Cisco IOS Release 12.2(33)SCD2 and later releases, this command is also supported on DOCSIS 3.0 cable modems. |

## Usage Guidelines

The **cable metering ipdr** command configures how SAMIS data is exported. This command is used for DOCSIS 2.0 SAMIS schema.

When **flow-aggregate** is enabled, the service flows are combined into one record per cable modem:

- ServiceClassName element always returns a null value in IPDR records, even when service flows on the cable modem have a valid service class name.
- ServiceIdentifier element always returns a zero value.

## Examples

The following example shows how to enable usage-based billing for IPDR, with the billing record interval set to every 60 minutes with full-records and flow-aggregate options enabled:

```
Router# configure terminal
Router(config)# cable metering ipdr 60 session 111 full-records flow-aggregate
Router(config)#
```

## Related Commands

| Command                                | Description                                                                                        |
|----------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>cable metering destination</b>      | Enables usage-based billing, and streams the billing records to an external server.                |
| <b>cable metering filesystem</b>       | Enables usage-based billing and writes the billing records to a file on a local file system.       |
| <b>cable metering source-interface</b> | Enables debugging of usage-based billing operations.                                               |
| <b>show cable metering-status</b>      | Displays information about the most recent usage-based billing operation.                          |
| <b>snmp-server enable traps cable</b>  | Ensure that the Simple Network Management Protocol (SNMP) traps are sent for cable-related events. |

# cable metering ipdr-d3

To configure the Subscriber Account Management Interface Specification (SAMIS) and to enable usage-based billing on DOCSIS 3.0 cable modems, use the **cable metering ipdr-d3** command in global configuration mode. To disable usage-based billing, use the **no** form of this command.

**cable metering ipdr-d3 session *session-id* type *type* [flow-aggregate] [full-records]**

**no cable metering**

## Syntax Description

|                                  |                                                                                                                                                                                                                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>session <i>session id</i></b> | Specifies the IPDR session ID. The valid session ID range is from 1 to 255.                                                                                                                                              |
| <b>type <i>type</i></b>          | Specifies the IPDR DOCSIS 3.0 service definition type of metering. The valid type range is from 1 to 2.                                                                                                                  |
| <b>flow-aggregate</b>            | (Optional) Combines all information for an individual cable modem into one record. Separate counters are maintained for upstream and downstream traffic, but those counters include all service flows in that direction. |
| <b>full-records</b>              | (Optional) Provides information about full service flow (active and idle) records.                                                                                                                                       |

## Command Default

Usage-based billing is disabled, by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCD2 | This command was introduced. |

## Usage Guidelines

The **cable metering ipdr-d3** command configures how the SAMIS data is exported. This command is used for DOCSIS 3.0 SAMIS schema (including type 1 and type 2).

When **flow-aggregate** is enabled, the service flows are combined into one record per cable modem:

- ServiceClassName element always returns a null value in IPDR records, even when service flows on the cable modem have a valid service class name.
- ServiceIdentifier element always returns a zero value.

## Examples

The following example shows how to enable usage-based billing for IPDR DOCSIS 3.0, with full-records and flow-aggregate options enabled:

```
Router# configure terminal
Router(config)# cable metering ipdr-d3 session 111 type 2 full-records flow-aggregate
Router(config)#
```

| Related Commands | Command                                        | Description                                                                                     |
|------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|
|                  | <b>cable metering destination</b>              | Enables usage-based billing, and streams the billing records to an external server.             |
|                  | <b>cable metering filesystem</b>               | Enables usage-based billing and writes the billing records to a file on a local file system.    |
|                  | <b>cable metering source-interface</b>         | Enables debugging of usage-based billing operations.                                            |
|                  | <b>cable sflog max-entry</b>                   | Enables service flow logging and configuring the number and duration of entries in the log.     |
|                  | <b>show cable metering-status</b>              | Displays information about the most recent usage-based billing operation.                       |
|                  | <b>snmp-server enable traps cable metering</b> | Ensures that Simple Network Management Protocol (SNMP) traps are sent for cable-related events. |

# cable metering source-interface

To enable specification of the source-interface for the billing packets, use the **cable metering source-interface** command in privileged EXEC mode. To turn off the specified source-interface, use the **no** form of this command.

**cable metering source-interface** *interface*

**no cable metering source-interface** *interface*

|                           |                  |                                                                                                                                                                                                                                        |
|---------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>interface</i> | Specifies the source of the usage based billing packets originated by the router using the <b>cable metering source-interface</b> command. This is often used to set the source-interface as the ip address of the loopback interface. |
|---------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Defaults</b> | Usage billing is disabled. When enabled, CPE IP addresses (a maximum of five per cable modem) are included in the billing records by default. |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

| <b>Command History</b> | Release    | Modification                 |
|------------------------|------------|------------------------------|
|                        | 12.3(21)BC | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>The <b>cable metering source-interface</b> command enables the user to specify the source-interface of the usage based billing packets. All billing packets are usually automatically assigned a source-interface, but users using the <b>cable metering source-interface</b> command can set the source-interface to be the ip address of the loopback interface.</p> |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

If the user does not specify the source-interface configuration, SAMIS will pick the highest IP address of the loopback interface as the source interface. If the loopback interface is not there, then SAMIS will select the highest IP of the physical interface for source interface.

Refer the DDTS for more info CSCek39658.



|             |                                                                                                                                     |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | If a loopback interface is specified, the mac address would be that of the management interface in the docID in the billing packet. |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------|



|             |                                                                                                                     |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | The option of specifying the source-interface for metering is available only after the metering mode is configured. |
|-------------|---------------------------------------------------------------------------------------------------------------------|

If the **cable metering source-interface** command is used when the Cable ARP Filtering feature is operating in the File Mode, the CMTS IP address in the billing packets will be changed to the ip address of the source-interface as specified through **cable metering source-interface** command or through setting the **ccmtrCollectionSrcIfIndex** object. The mac address in the billing packets' header will also be changed to the mac address of the source-interface.

If the **cable metering source-interface** command is used when the Cable ARP Filtering feature is operating in the Streaming Mode, the CMTS IP address in the billing packets, as well as the source IP address of the billing packets, will be changed to the ip address of the source-interface as specified through **cable metering source-interface** command or through setting the **ccmtrCollectionSrcIfIndex** object. The mac address in the billing packets' header will also be changed to the mac address of the source-interface.

When defining the source-interface, the following possible error checks can be performed to determine if the source-interface that the user has defined is a valid source-interface for metering:

1. Verify that the interface specified is up and has an ip address.
2. Verify that the ip address is in the same subnet/majornet as that of the destination address.



#### Note

Even after performing these error checks, there are no guarantees that the billing packets will be sent out since the TCP connection may not succeed due to the absence of a physical connection between the CMTS and the collection server.

### Examples

The following is an example where the source-interface specified was a loopback interface and it had a mac-address of 000C31F6F400 and an ip address of 1.100.100.100.

```
Router# configure terminal
Router(config)# cable metering source-interface loopback 1.100.100.100

<?xmlversion="1.0"encoding="UTF8"?><IPDRDocxmlns="http://www.ipdr.org/namespaces/ipdr"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="DOCSIS-3.5-A.0.xsd" docId="C7B1B20E-0000-0000-0000-000C31F6F400"
creationTime="2006-03-02T18:03:58Z" IPDRRecorderInfo="VXR3" version="3.5-A.0"><IPDR
xsi:type="DOCSIS-Type"><IPDRcreationTime>2006-03-02T18:03:58Z</IPDRcreationTime><CMTShostn
ame>VXR3</CMTShostname><CMTSipAddress>1.100.100.100</CMTSipAddress><CMTSsysUpTime>185867
</CMTSsysUpTime><CMTScatvIfName>Cable4/0</CMTScatvIfName><CMTScatvIfIndex>16</CMTScatvIfIn
dex><CMTSupIfName>Ca4/0-upstream0</CMTSupIfName><CMTSupIfType>129</CMTSupIfType><CMTSdownI
fName>Ca4/0-downstream</CMTSdownIfName><CMmacAddress>00-07-0E-07-0B-0D</CMmacAddress><CMip
Address>11.11.0.2</CMipAddress><CMdocsisMode>1.0</CMdocsisMode><Rectype>1</Rectype><servic
eIdentifier>0</serviceIdentifier><serviceClassName></serviceClassName><serviceDirection>1<
/serviceDirection><serviceOctetsPassed>6225</serviceOctetsPassed><servicePktsPassed>21</s
ervicePktsPassed><serviceSlaDropPkts>0</serviceSlaDropPkts><serviceSlaDelayPkts>1</serviceS
laDelayPkts><serviceTimeCreated>0</serviceTimeCreated><serviceTimeActive>0</serviceTimeAct
ive></IPDR><IPDR
xsi:type="DOCSIS-Type"><IPDRcreationTime>2006-03-02T18:03:58Z</IPDRcreationTime><CMTShostn
ame>VXR3</CMTShostname><CMTSipAddress>1.100.100.100</CMTSipAddress><CMTSsysUpTime>185867
</CMTSsysUpTime><CMTScatvIfName>Cable4/0</CMTScatvIfName><CMTScatvIfIndex>16</CMTScatvIfIn
dex><CMTSupIfName>Ca4/0-upstream0</CMTSupIfName><CMTSupIfType>129</CMTSupIfType><CMTSdownI
fName>Ca4/0-downstream</CMTSdownIfName><CMmacAddress>00-07-0E-07-0B-0D</CMmacAddress><CMip
Address>11.11.0.2</CMipAddress><CMdocsisMode>1.0</CMdocsisMode><Rectype>1</Rectype><servic
eIdentifier>0</serviceIdentifier><serviceClassName></serviceClassName><serviceDirection>2<
/serviceDirection><serviceOctetsPassed>12300</serviceOctetsPassed><servicePktsPassed>29</s
ervicePktsPassed><serviceSlaDropPkts>0</serviceSlaDropPkts><serviceSlaDelayPkts>13</servi
ceSlaDelayPkts><serviceTimeCreated>0</serviceTimeCreated><serviceTimeActive>0</serviceTimeA
ctive></IPDR><IPDRDoc.End count="2" endTime="2006-03-02T18:03:59Z"/></IPDRDoc>

Router(config)#
```

The following is an example where the source-interface specified was a loopback interface and it had a mac-address of 00027D67DC0 and an ip address of 2.90.100.100.

```
Router# configure terminal
Router(config)# cable metering source-interface loopback 2.90.100.10

Accept 2.90.100.100:42380
```



```
<?xmlversion="1.0"encoding="UTF8"?><IPDRDocxmlns="http://www.ipdr.org/namespaces/ipdr"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="DOCSIS-3.5-A.0.xsd" docId="C7B701D1-0000-0000-0000-00027D67DC00"
creationTime="2006-03-06T18:45:37Z" IPDRRecorderInfo="ubr7246-R7427"
version="3.5-A.0"><IPDR
xsi:type="DOCSIS-Type"><IPDRcreationTime>2006-03-06T18:45:37Z</IPDRcreationTime><CMTShostn
ame>ubr7246-R7427</CMTShostname><CMTSipAddress>2.90.100.100</CMTSipAddress><CMTSsysUpTime>
372172
</CMTSsysUpTime><CMTScatvIfName>Cable3/0</CMTScatvIfName><CMTScatvIfIndex>5</CMTScatvIfInd
ex><CMTSupIfName>Ca3/0-upstream0</CMTSupIfName><CMTSupIfType>129</CMTSupIfType><CMTSdownIf
Name>Ca3/0-downstream</CMTSdownIfName><CMmacAddress>00-50-04-F9-EF-88</CMmacAddress><CMipA
ddress>11.40.1.2</CMipAddress><CMdocsisMode>1.0</CMdocsisMode><Rectype>1</Rectype><service
Identifier>3</serviceIdentifier><serviceClassName></serviceClassName><serviceDirection>2</
serviceDirection><serviceOctetsPassed>228392</serviceOctetsPassed><servicePktsPassed>2216<
/servicePktsPassed><serviceSlaDropPkts>0</serviceSlaDropPkts><serviceSlaDelayPkts>0</servi
ceSlaDelayPkts><serviceTimeCreated>6500</serviceTimeCreated><serviceTimeActive>3648</servi
ceTimeActive></IPDR><IPDR
xsi:type="DOCSIS-Type"><IPDRcreationTime>2006-03-06T18:45:37Z</IPDRcreationTime><CMTShostn
ame>ubr7246-R7427</CMTShostname><CMTSipAddress>2.90.100.100</CMTSipAddress><CMTSsysUpTime>
372172
</CMTSsysUpTime><CMTScatvIfName>Cable3/0</CMTScatvIfName><CMTScatvIfIndex>5</CMTScatvIfInd
ex><CMTSupIfName>Ca3/0-upstream0</CMTSupIfName><CMTSupIfType>129</CMTSupIfType><CMTSdownIf
Name>Ca3/0-downstream</CMTSdownIfName><CMmacAddress>00-50-04-F9-EF-88</CMmacAddress><CMipA
ddress>11.40.1.2</CMipAddress><CMdocsisMode>1.0</CMdocsisMode><Rectype>1</Rectype><service
Identifier>4</serviceIdentifier><serviceClassName></serviceClassName><serviceDirection>1</
serviceDirection><serviceOctetsPassed>200134</serviceOctetsPassed><servicePktsPassed>2197<
/servicePktsPassed><serviceSlaDropPkts>0</serviceSlaDropPkts><serviceSlaDelayPkts>0</servi
ceSlaDelayPkts><serviceTimeCreated>6500</serviceTimeCreated><serviceTimeActive>3648</servi
ceTimeActive></IPDR><IPDRDoc.End count="2" endTime="2006-03-06T18:45:37Z"/></IPDRDoc>
Closing socket 2.90.100.100:42380
```

Router(config)#

## Related Commands

| Command                                | Description                                                                                      |
|----------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable metering source-interface</b> | Enables usage-based billing and streams the billing records to an external server.               |
| <b>cable metering filesystem</b>       | Enables usage-based billing and writes the billing records to a file on a local file system.     |
| <b>debug cable remote-query</b>        | Turns on debugging to gather information from remote CMs.                                        |
| <b>show cable metering-status</b>      | Displays information about the most recent usage-based billing operation.                        |
| <b>snmp-server enable traps cable</b>  | Enables the sending of Simple Network Management Protocol (SNMP) traps for cable-related events. |

# cable modem access-group

To configure the access-group for a CM, use the **cable modem access-group** command in privileged EXEC mode. To disable the specification, use the **no access-group** form of this command.

**cable modem** {*mac-addr* | *ip-addr*} **access-group** [*access-list* | *access-name*]

**cable modem** {*mac-addr* | *ip-addr*} **no access-group**



## Note

The **cable modem access-group** command is not supported on the Cisco uBR10012 universal broadband router.

## Syntax Description

|                    |                                                                                 |
|--------------------|---------------------------------------------------------------------------------|
| <i>ip-addr</i>     | Specifies the IP address for the CM.                                            |
| <i>mac-address</i> | Specifies the MAC address for the CM.                                           |
| <i>access-list</i> | Specifies the IP access list (standard or extended). Valid values are 1 to 199. |
| <i>access-name</i> | Specifies the access-list name.                                                 |

## Command Default

No default behaviors or values

## Command Modes

Privileged EXEC

## Command History

| Release    | Modification                                                                                                                                                             |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3(8) NA | This command was introduced.                                                                                                                                             |
| 12.2(4)BC1 | The functionality of this command was made identical to that of the <b>cable host access-group</b> command, but both commands were retained for backwards compatibility. |

## Examples

The following example shows the **cable modem access-group** command assigning access-list 1 to the CM with the MAC address of **abcd.ef01.2345**:

```
Router# cable modem abcd.ef01.2345 access-group 1
Router#
```

## Related Commands

| Command                             | Description                                              |
|-------------------------------------|----------------------------------------------------------|
| <b>cable host access-group</b>      | Configures the access list for a host.                   |
| <b>cable modem change-frequency</b> | Changes the downstream frequency or upstream channel ID. |
| <b>cable modem max-hosts</b>        | Specifies the maximum hosts for a CM.                    |
| <b>cable modem qos profile</b>      | Specifies the QoS profile for a CM.                      |
| <b>show cable modem</b>             | Displays CM configuration settings.                      |

# cable modem change-frequency

To override the frequency used by a CM, use the **cable modem change-frequency** command in privileged EXEC mode.

```
cable modem {mac-addr | ip-addr} change-frequency
 {ds-frequency-hz [us-channel-id] | us-channel-id}
```

|                           |                        |                                                           |
|---------------------------|------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | <i>ip-addr</i>         | Specifies the IP address for the CM.                      |
|                           | <i>mac-address</i>     | Specifies the MAC address for the CM.                     |
|                           | <i>ds-frequency-hz</i> | Specifies the downstream frequency for the CM (in Hertz). |
|                           | <i>us-channel-id</i>   | Specifies the upstream channel ID.                        |

|                        |                               |
|------------------------|-------------------------------|
| <b>Command Default</b> | No default behavior or values |
|------------------------|-------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| <b>Command History</b> | Release   | Modification                 |
|------------------------|-----------|------------------------------|
|                        | 12.0(4)XI | This command was introduced. |

|                         |                                                                                                                                                                                                           |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command allows the CMTS administrator to change the downstream frequency for a CM, overriding the DOCSIS configuration file setting. This command is not applicable on Cisco IOS Release 12.1(3a)EC. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                           |
|-----------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to change the downstream frequency of the CM having IP address 172.172.172.12 to 570 MHz: |
|-----------------|---------------------------------------------------------------------------------------------------------------------------|

```
Router# cable modem 172.172.172.12 change-freq 57000000
Router#
```

| <b>Related Commands</b> | Command                         | Description                           |
|-------------------------|---------------------------------|---------------------------------------|
|                         | <b>cable modem access-group</b> | Specifies an access group for a CM.   |
|                         | <b>cable modem max-hosts</b>    | Specifies the maximum hosts for a CM. |
|                         | <b>cable modem qos profile</b>  | Specifies the QoS profile for a CM.   |
|                         | <b>show cable modem</b>         | Displays CM configuration settings.   |

# cable modem max-cpe

To specify a maximum number of permitted hosts per modem (overriding the max-cpe value in the CM configuration file), use the **cable modem max-cpe** command in global configuration mode.

**cable modem max-cpe** [*n* | **unlimited**]

**Syntax Description**

|                  |                                                                  |
|------------------|------------------------------------------------------------------|
| <i>n</i>         | Specifies the configuration file value. Valid range is 1 to 255. |
| <b>unlimited</b> | Specifies the maximum CPE value to be unlimited.                 |

**Command Default**

The **max-cpe** value provided in the configuration file will be used by the CMTS to limit the number of hosts connected to a single CM (**no cable modem max-cpe**).

**Command Modes**

Global configuration

**Command History**

| Release               | Modification                 |
|-----------------------|------------------------------|
| 12.0(10)SC, 12.1(2)EC | This command was introduced. |

**Examples**

The following example shows how to override the **max-cpe** setting in a CM configuration file:

```
Router(config)# cable modem max-cpe unlimited
```

**Usage Guidelines**

The CMTS enables up to *n* number of hosts for a modem. When set to **unlimited**, or *n* is greater than the **max-cpe** value in the configuration file of a CM, the **max-cpe** value in the configuration file of the CM is used.

  
**Note**

When the the maximum number of CPEs set by the **cable modem max-cpe** command in the Cisco CMTS, is smaller than the maximum number of CPEs set in the configuration file of the CMs, the number set by the **cable modem max-cpe** command overrides the number set in the configuration file of the CMs.

  
**Note**

When setting to **unlimited** or *n* is greater than the **max-cpe** value in the configuration file of a CM, the CM has to control the maximum number of hosts, and the DHCP server has to control the number of IP addresses assigned to hosts behind a single CM.

**Caution**

Use of this command might open a security hole in the system by enabling denial of service attacks. Specifically, it might enable a user to obtain a large number of IP addresses, thereby taking down the entire network, after all the available IP addresses have been reserved by this single user. Cisco recommends that, if this command is enabled, the number of IP addresses assigned to hosts behind a single modem be strictly controlled by the DHCP server.

The Cisco CMTS uses three commands set the maximum number of hosts for a particular CM, for all CMs on a particular cable interface, or for all CMs using the Cisco CMTS router:

- **cable modem max-hosts**—Sets the maximum number of hosts for a particular CM.
- **cable max-hosts**—Sets the maximum number of hosts for all CMs on a particular cable interface.
- **cable modem max-cpe**—Sets the maximum number of hosts for all CMs using the Cisco CMTS router.

The more specific commands override the settings of the less specific commands. For example, if you use the **cable modem max-cpe** command to set the maximum number of hosts to 2 for all CMs, you can still use the **cable modem max-hosts** command to give a particular CM a larger maximum host value.

**Note**

The CMTS assigns the MAX Host value to a cable modem at the time that the cable modem registers with the CMTS. Changing any of the MAX Host commands affects only cable modems that register after the change.

**Tip**

For more information on how these commands interact to set the maximum CPE values, see the chapter *Maximum CPE or Host Parameters for the Cisco Cable Modem Termination System* in the *Cisco CMTS Feature Guide*, available on Cisco.com and the Documentation CD-ROM.

**Note**

The “Number of CPEs” field in the **show cable modem** command shows the maximum CPE value for the CM, not the value for the CMTS that is set by the **cable modem max-cpe** command.

**Related Commands**

| Command                             | Description                                                                   |
|-------------------------------------|-------------------------------------------------------------------------------|
| <b>cable max-hosts</b>              | Sets the maximum number of hosts for all CMs on a particular cable interface. |
| <b>cable modem access-group</b>     | Specifies an access group for a CM.                                           |
| <b>cable modem change-frequency</b> | Changes the downstream frequency or upstream channel ID.                      |
| <b>cable modem max-hosts</b>        | Sets the maximum number of hosts for a particular CM.                         |
| <b>cable modem qos profile</b>      | Specifies the QoS profile for a CM.                                           |
| <b>show cable modem</b>             | Displays CM configuration settings.                                           |

# cable modem v6-max-cpe-prefix

To specify the maximum number of IPv6 addresses per modem, use the **cable modem v6-max-cpe-prefix** command in global configuration mode. To set the default value of the command, use the **no** form of this command.

**cable modem v6-max-cpe-prefix** [*n*]

**no cable modem v6-max-cpe-prefix** [*n*]

## Syntax Description

|          |                                                                                                           |
|----------|-----------------------------------------------------------------------------------------------------------|
| <i>n</i> | Specifies the maximum number of IPv6 addresses per modem. The range is from 0 to 1023. The default is 16. |
|----------|-----------------------------------------------------------------------------------------------------------|

## Command Default

The default number of IPv6 addresses per modem is 16.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCH1 | This command was introduced. |

## Usage Guidelines



### Note

This command is used to check the IPv6 Global Unicast Address (GUA), link-local address (LLA) and IPv6 Prefix Delegation (PD) of the CPE.

## Examples

The following example shows how to specify the maximum number of the IPv6 addresses per modem:

```
Router> enable
Router# configure terminal
Router(config)# cable modem v6-max-cpe-prefix 10
Router(config)# cable submgmt default active
Router(config)# exit
```

## Related Commands

| Command                 | Description                                                            |
|-------------------------|------------------------------------------------------------------------|
| <b>show cable modem</b> | Displays information for the registered and unregistered cable modems. |

# cable modem max-hosts

To specify the maximum number of customer premises equipment (CPE) devices (hosts) that can be supported by a specific CM, use the **cable modem max-hosts** command in privileged EXEC mode.

**cable modem** {*mac-addr* | *ip-addr*} **max-hosts** {*n* | **default**}

|                    |                                                |                                                                                                                        |
|--------------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>ip-addr</i>                                 | Specifies the IP address for the CM.                                                                                   |
|                    | <i>mac-address</i>                             | Specifies the MAC address for the CM.                                                                                  |
|                    | <b>max-hosts</b> { <i>n</i>   <b>default</b> } | Specifies either the maximum number of hosts supported by the CM (from 0 to 255), or specifies the default value of 0. |

|                 |   |
|-----------------|---|
| Command Default | 0 |
|-----------------|---|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

| Command History | Release   | Modification                 |
|-----------------|-----------|------------------------------|
|                 | 12.0(4)XI | This command was introduced. |

**Usage Guidelines**

The Cisco CMTS uses three commands set the maximum number of hosts for a particular CM, for all CMs on a particular cable interface, or for all CMs using the Cisco CMTS router:

- **cable modem max-hosts**—Sets the maximum number of hosts for a particular CM.
- **cable max-hosts**—Sets the maximum number of hosts for all CMs on a particular cable interface.
- **cable modem max-cpe**—Sets the maximum number of hosts for all CMs using the Cisco CMTS router.

The more specific commands override the settings of the less specific commands. For example, if you use the **cable modem max-cpe** command to set the maximum number of hosts to 2 for all CMs, you can still use the **cable modem max-hosts** command to give a particular CM a larger maximum host value.

**Note**

The CMTS assigns the MAX Host value to a cable modem at the time that the cable modem registers with the CMTS. Changing any of the MAX Host commands affects only cable modems that register after the change.

**Tip**

For more information on how these commands interact to set the maximum CPE values, see the chapter *Maximum CPE or Host Parameters for the Cisco Cable Modem Termination System* in the *Cisco CMTS Feature Guide*, available on Cisco.com and the Documentation CD-ROM.

**Examples**

The following example shows sets the CM with the IP address of 172.172.172.12 to a maximum of 40 attached CPE devices:

```
Router# cable modem 172.172.172.12 max-hosts 40
```

**Related Commands**

| Command                             | Description                                                                   |
|-------------------------------------|-------------------------------------------------------------------------------|
| <b>cable modem access-group</b>     | Specifies an access group for a CM.                                           |
| <b>cable modem change-frequency</b> | Changes the downstream frequency or upstream channel ID.                      |
| <b>cable max-hosts</b>              | Sets the maximum number of hosts for all CMs on a particular cable interface. |
| <b>cable modem max-cpe</b>          | Sets the maximum number of hosts for all CMs using the Cisco CMTS router.     |
| <b>cable modem qos profile</b>      | Specifies the QoS profile for a CM.                                           |
| <b>show cable modem</b>             | Displays CM configuration settings.                                           |



# cable modem qos profile

To force a DOCSIS 1.0 CM to use a specific quality-of-service (QoS) profile, use the **cable modem qos profile** command in global configuration mode.

**cable modem** {*mac-addr* | *ip-addr*} **qos profile** *qos-profile-index* [**no-persistence**]

|                           |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>ip-addr</i>           | Specifies the IP address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                           | <i>mac-address</i>       | Specifies the MAC address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                           | <i>qos-profile-index</i> | Specifies QoS profile index values. The valid range is 1 to 1023, with no default. In Cisco IOS Release 12.2(15)BC1 and later releases, this profile must be created on the Cisco CMTS using the <b>cable qos profile</b> command. In addition, this profile should specify a maximum upstream bandwidth equal to or less than the current bandwidth. If the new profile specifies a higher bandwidth, it is ignored, and the cable modem continues to use the bandwidth that was specified at registration time. |
|                           | <b>no-persistence</b>    | (Optional) Specifies that the QoS profile should not remain in force when a cable modem reboots. Instead, when a cable modem reboots, it uses the QoS profile specified in its DOCSIS configuration file.                                                                                                                                                                                                                                                                                                         |
|                           |                          | The default is without this option, so that the QoS profile remains in force for cable modems across reboots.                                                                                                                                                                                                                                                                                                                                                                                                     |

**Command Default** No default behaviors or values

**Command Modes** Global configuration

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                                                |
|------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.0(4)XI      | This command was introduced.                                                                                                                                                                                                                                                                                       |
|                        | 12.1(11)EC     | This command was supported on Cisco IOS Release 12.1 EC.                                                                                                                                                                                                                                                           |
|                        | 12.2(8)BC1     | This command was enhanced to allow a DOCSIS 1.1 CMTS to temporarily change the QoS profile for DOCSIS 1.0 and 1.0+ CMs.                                                                                                                                                                                            |
|                        | 12.2(15)BC1    | This command was changed so that it does not have any effect unless both the QoS profile specified by this command and the QoS profile specified for the CM in its DOCSIS configuration file are already created on the Cisco CMTS. This restriction did not exist in previous releases.                           |
|                        | 12.2(15)BC2    | The <b>no-persistence</b> option was added. Also, the restriction on changing CM-created profiles that was implemented in Cisco IOS Release 12.2(15)BC1 was removed, so that this command can again be used to change the profile of a CM that is using a CM-created profile, as was the case in earlier releases. |

**Usage Guidelines** On a Cisco CMTS running DOCSIS 1.0 software, the **cable modem qos profile** command forces a CM to use a specific QoS profile.

On a Cisco CMTS running DOCSIS 1.1 software, the **cable modem qos profile** command temporarily forces a DOCSIS 1.0 or DOCSIS 1.0+ CM to use a specific QoS profile, without forcing the CM to first go off-line and re-register. For DOCSIS 1.0+ CMs, this command affects only the primary SID on the CM.

**Note**

In Cisco IOS Release 12.2(15)BC1, this command has an effect only when the profile that it specifies and the original QoS profile on the CM have been created already on the Cisco CMTS, using the **cable qos profile** command. In Cisco IOS Release 12.2(15)BC2 and later releases, this restriction is removed and this command can also be used to change the profile for a CM even when it is using a CM-created QoS profile.

This command does not affect DOCSIS 1.1 CMs, which support dynamic service change messages that allow the QoS profile to be changed dynamically.

**Note**

This command acts as a toggle. Give the **cable modem qos profile** command once to enforce a QoS profile. Give the same command again with the same parameters to cancel the enforcement of that profile (the CM will return to using its registered profile.)

When the **no-persistence** option is specified, the QoS profile is not applied when a cable modem reboots. Instead, the Cisco CMTS allows the cable modem to use the QoS profile that is specified in its DOCSIS configuration file.

The **no-persistence** option can be used when initially when identifying potential problem applications and users. When repeat offenders are identified, the service provider can remove the **no-persistence** option, so that these users continue to use the specified QoS profile even if they reboot their cable modems.

**Examples**

The following example shows how to specify a QoS profile index to a CM:

```
Router# cable modem qos profile 255
Router#
```

**Related Commands**

| Command                             | Description                                              |
|-------------------------------------|----------------------------------------------------------|
| <b>cable modem access-group</b>     | Specifies an access group for a CM.                      |
| <b>cable modem change-frequency</b> | Changes the downstream frequency or upstream channel ID. |
| <b>cable modem max-hosts</b>        | Specifies the maximum hosts for a CM.                    |
| <b>show cable modem</b>             | Displays CM configuration settings.                      |

# cable modem remote-query

To enable and configure the remote query feature to gather cable modem performance statistics on the Cisco CMTS router, use the **cable modem remote-query** command in global configuration mode. To disable the gathering of cable modem statistics, use the **no** form of this command.

**cable modem remote-query** [*polling-interval* *community-string*] [**src-ip** *ip-address*]

**no cable modem remote-query** [**src-ip** *ip-address*]

## Syntax Description

|                                 |                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>polling-interval</i>         | (Optional) The delay between each poll that the Cisco CMTS router makes to collect cable modem statistics. When the Cisco CMTS router completes one remote query poll, the router waits this time period before beginning another poll. The valid range is from 1 to 86,400 seconds, with a recommended default value of 30 seconds.                           |
| <i>community-string</i>         | (Optional) The Simple Network Management Protocol (SNMP) community string.<br><br><b>Note</b> If resetting a configured SNMP community string value, first disable the remote query feature with the <b>no</b> form of this command, then set the new community string using the <b>cable modem remote-query</b> command when the polling delays is timed out. |
| <b>src-ip</b> <i>ip-address</i> | (Optional) Specifies the source IP address for SNMP requests.<br><br><b>Note</b> You should enable the remote query feature before configuring <b>src-ip</b> option.                                                                                                                                                                                           |

## Command Default

None

## Command Modes

Global configuration (config)

## Command History

| Release                 | Modification                                                                                                                                                                                                           |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(7)XR, 12.1(2)T     | This command was introduced.                                                                                                                                                                                           |
| 12.1(2)EC1              | Support for this command was added to the 12.1 EC train.<br><br><b>Note</b> This command is not supported on Cisco IOS Release 12.1(3a)EC1 but is supported on Cisco IOS Release 12.1(4)EC and later 12.1 EC releases. |
| 12.2(4)BC1b             | Support for this command was added to the 12.2 BC train.                                                                                                                                                               |
| 12.2(15)BC1, 12.2(15)CX | The sysDescr field is now obtained for each cable modem when the remote query feature is enabled. (This value can be displayed using the <b>verbose</b> option of the <b>show cable modem</b> command.                 |
| 12.3(23)BC              | Support for the <b>scr-ip</b> option was added to this release.                                                                                                                                                        |

**Usage Guidelines**

To use the remote query feature, you must configure the cable modem and Cisco CMTS as follows:

- Configure a read-only SNMP community string on the cable modem for use with the remote query feature. This should be a separate community string from the read-write string used to remotely monitor and configure the cable modem.
- Configure a matching community string on the Cisco CMTS using the **snmp-server community community-string** and **snmp-server manager** commands.
- Enable the remote query feature on the Cisco CMTS with the **cable modem remote-query** command. The *polling-interval* should be chosen so that the statistics can be obtained in a timely manner without seriously impacting system performance. Cisco recommends initially setting the *polling-interval* to 30 seconds and adjusting that time period as needed.

**Note**

If the remote query feature is enabled, the Cisco CMTS router consumes extra memory per cable modem and takes additional CPU time. We recommend that you do not configure this feature on routers that have lower free memory or a large number of cable modems.

The *polling-interval* time period determines only how long the Cisco CMTS router waits after completing one polling cycle before beginning a new polling cycle. It does not indicate how long the router spends in each polling cycle, which depends on the number of cable modems being polled. To calculate the approximate time for a polling cycle, assume 4 to 5 CMs per second (100 to 200 milliseconds per CM). Also take into account the possibility that one or more cable modems might not respond, with an approximate timeout period of 90 seconds.

You must specify matching community strings for the cable modem, the **snmp-server community community-string** command, and the **cable modem remote-query** command.

You can reissue the **cable modem remote-query** command to change the polling interval at any time, and the change becomes effective immediately. However, to change the SNMP community string, you must first disable remote polling with the **no snmp manager** and **no cable modem remote-query** commands. Then reconfigure the new community string with the **snmp-server community community-string**, **snmp-server manager**, and **cable modem remote-query** commands.

You must configure the remote query feature before configuring the **scr-ip** option.

**Tip**

After enabling the remote query feature, you can display the collected statistics with the **show cable modem remote-query** command. You can also display these statistics by querying the attributes in the [CISCO-DOCS-REMOTE-QUERY-MIB](#) MIB.

**Resetting the Community String for Cable Modem Remote Query**

In Cisco IOS Release 12.3BC and later releases, if you wish to reconfigure the SNMP *community string* for the cable modem remote query feature, perform these brief steps.

1. Disable the remote query feature with the **no** form of this command.
2. Reset the timers on the Cisco CMTS router with short timeout values for the polling interval, so that timeout commences quickly. Use the **cable modem remote-query** command in privileged EXEC mode, using a very low value for the *polling interval* value.
3. Once time-outs are applied, reset the *community string* value with the **cable modem remote-query** command.
4. Change the *polling interval* timers on the Cisco CMTS router back to preferred levels using the **cable modem remote-query** command in privileged EXEC mode.

## Examples

The following example illustrates how to set the polling interval to 5 seconds and the SNMP community string to **private**:

```
Router# configure terminal
Router(config)# cable modem remote-query 5 private
Router(config)# snmp-server community private
Router(config)# snmp-server manager
```

The following example demonstrates how to change the remote query configuration, by first deleting the existing configuration and then giving the new configuration:

```
Router# configure terminal
Router(config)# no cable modem remote-query
Router(config)# no snmp-server manager
Router(config)# cable modem remote-query 10 public
Router(config)# snmp-server community public
Router(config)# snmp-server manager
```

## Related Commands

| Command                               | Description                                                                    |
|---------------------------------------|--------------------------------------------------------------------------------|
| <b>debug cable remote-query</b>       | Turns on debugging to gather information from remote CMs.                      |
| <b>show cable modem</b>               | Displays information for the registered and unregistered CMs.                  |
| <b>show cable modem phy</b>           | Displays DOCSIS PHY layer information for one or more CMs.                     |
| <b>show cable modem remote-query</b>  | Displays the statistics accumulated by the remote query feature.               |
| <b>snmp-server enable traps cable</b> | Enables traps that are sent when the remote polling of CMs has been completed. |

# cable modem service-class-name

To change a QoS service class for a particular cable modem (CM), use the **cable modem service-class-name** command in privileged EXEC mode.

**cable modem** {*ip-address* | *mac-address*} **service-class-name** *name*

## Syntax Description

|                    |                                                                             |
|--------------------|-----------------------------------------------------------------------------|
| <i>ip-address</i>  | Specifies the IP address of the CM to be assigned the named service class.  |
| <i>mac-address</i> | Specifies the MAC address of the CM to be assigned the named service class. |
| <i>name</i>        | Specifies the name of the QoS service class.                                |

## Command Default

No default behavior or values

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC2 | This command was introduced.                                                                                       |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

This command has the following restrictions:

- The **no** form of the command is not supported, as the CMTS does not cache the service class parameters of the modem.
- The command is supported only on DOCSIS 1.1 CMs primary service flows.
- You can specify this command only after the CM has been online for at least 200 seconds.
- The parameters defined by the named service class should be a subset of the admitted qos parameters. Normally, the admitted and the active parameters have the same qos parameters. However, it is better to ensure that the following parameters are a subset of the original or registered set of parameters: **priority**, **max-rate**, **max-burst**, **min-rate**, **max-latency**, **min-packet-size**, **act\_timeout**, or **adm\_timeout**. Also, ensure that the values of **required\_mask**, **forbidden\_mask** and **aggregate\_mask** are the same.

## Examples

The following example changes the QoS parameter set for the CM with MAC address aaaa.bbbb.cccc to the service class named "test":

```
Router# cable modem aaaa.bbbb.cccc service-class-name test
```

**Related Commands**

| Command                                 | Description                                                                          |
|-----------------------------------------|--------------------------------------------------------------------------------------|
| <b>cable service class</b>              | Sets parameters for a DOCSIS 1.1 cable service class.                                |
| <b>service-class<br/>(enforce-rule)</b> | Identifies a particular service class for cable modem monitoring in an enforce-rule. |

# cable multicast ses-cache

To enable multicast replication session on the forwarding interface, use the **cable multicast ses-cache** command in global configuration and interface configuration mode. To disable, use the **no cable multicast ses-cache** command.

```
cable multicast ses-cache value
no cable multicast ses-cache value
```

|                    |       |                                                                                                                       |
|--------------------|-------|-----------------------------------------------------------------------------------------------------------------------|
| Syntax Description | value | Sets the value for the multicast replication session cache. The valid range is from 0 to 500. The default value is 0. |
|--------------------|-------|-----------------------------------------------------------------------------------------------------------------------|

|                 |                                      |
|-----------------|--------------------------------------|
| Command Default | This command is disabled by default. |
|-----------------|--------------------------------------|

|               |                                                                      |
|---------------|----------------------------------------------------------------------|
| Command Modes | Global configuration (config)<br>Interface configuration (config-if) |
|---------------|----------------------------------------------------------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCH | This command was introduced. |

|                  |                                                                                                                                                                                                                              |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | Multicast replication session cache feature helps reducing CPU utilization by reusing multicast replication sessions stored in the cache. The sessions are cached and reused later when a new IGMP join request is received. |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                          |                                                                         |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|  Note | Only IPv4 IGMP multicast replication sessions can be cached and reused. |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|

The multicast replication session cache can be configured at a global level for all the interfaces on the Cisco uBR10012 router or at an interface level for a forwarding interface. The session cache value configured at the interface shall override the global configuration.

The **cable multicast ses-cache** command is supported on the integrated-cable, modular-cable, and wideband-cable interfaces.

|                                                                                          |                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  Note | <ul style="list-style-type: none"><li>Ensure that the session cache value being configured is lower than that the current value.</li><li>Changing the multicast replication session cache value from 10 to 0 clears the current cache.</li></ul> |
|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                     |                                                                                                                                                                                                                             |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Associated Features | The <b>cable multicast ses-cache</b> command is used with the multicast replication session cache feature: <ul style="list-style-type: none"><li><a href="#">DOCSIS 3.0 Multicast Support on the CMTS Routers</a></li></ul> |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## Examples

The following example sets the multicast replication session cache to 100 at the global level on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# cable multicast ses-cache 100
Router(config)# exit
```

The following example sets the multicast replication session cache on the integrated interface to 10:

```
Router# configure terminal
Router(config)# interface Integrated-Cable 8/1/0:0
Router(config-if)# cable multicast ses-cache 10
```

## Related Commands

| Command                                | Description                                                                                                                      |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>clear cable multicast ses-cache</b> | Clears the cached multicast replication sessions on the interfaces on the Cisco uBR10012 router.                                 |
| <b>show cable multicast ses-cache</b>  | Displays the multicast replication session cache information both at the global and interface level of the forwarding interface. |

# cable modem vendor

To associate the name of a vendor with its Organizational Unique Identifier (OUI), use the **cable modem vendor** command in global configuration mode. To remove the association of the vendor name with its OUI, use the **no** form of this command.

**cable modem vendor** *OUI* [*vendor-name*]

**no cable modem vendor** *OUI* [*vendor-name*]

## Syntax Description

*OUI* Specifies the Organizational Unique Identifier (OUI). An OUI is the first 3 octets (3 bytes, 6 hexadecimal digits) of the CM MAC address and typically indicates the vendor for the CM. The octets can be specified as one string (for example: **000102**), or each octet can be separated by a hyphen, period, or colon (for example: **00-01-02** or **00:01:02** or **00.01.02**).

**Note** You can use either a period or colon as the separator between octets when manually entering this command, but the command that is written to the running and startup configuration files will always use a period.

*vendor-name* (Optional) Specifies an arbitrary string identifying the vendor for this OUI.

## Command Default

A default database contains approximately 300 OUIs associated with approximately 60 vendor names.

## Command Modes

Global configuration

## Command History

| Release    | Modification                 |
|------------|------------------------------|
| 12.2(8)BC2 | This command was introduced. |

## Usage Guidelines

The **cable modem vendor** command allows you to associate an arbitrary string with an OUI to identify the vendor of the associated CM. The vendor name is then displayed as part of the **show cable modem vendor** command.

The **show cable modem vendor** command uses a default database of approximately 300 OUIs. If the OUI and vendor are not in that database, the **show cable modem vendor** command displays the OUI as the vendor name, but you can use the **cable modem vendor** command to associate a vendor name with the new OUI.

If you specify an OUI with the **cable modem vendor** command that already exists in the OUI database, the previous value is overwritten with the new value. You can use the **default** prefix to restore the original value for an OUI in the default database.

You can also use the **no cable modem vendor** command to remove the association between an OUI and a vendor name. The **show cable modem vendor** command then displays only the OUI as the vendor name.

**Tip**

The Institute of Electrical and Electronics Engineers (IEEE) is the official issuer of OUI values. The IEEE OUI web site is at <http://standards.ieee.org/regauth/oui/index.shtml>.

**Examples**

The following shows several examples of the **cable modem vendor** command using Cisco OUIs:

```
Router(config)# cable modem vendor 00:01:42 Cisco
Router(config)# cable modem vendor 00:01:43 Cisco
Router(config)# cable modem vendor 00:01:63 Cisco
Router(config)# cable modem vendor 00:01:64 Cisco
Router(config)# cable modem vendor 00:0A:41 Cisco
Router(config)# cable modem vendor 00:0A:42 Cisco
Router(config)#
```

The following shows an example of the **default cable modem vendor** command being used to restore the original association between Cisco and its company OUI of 00:00:0C. Any previous user-defined vendor name is deleted from the OUI database.

```
Router(config)# default cable modem vendor 00000C
```

The following shows an example of the **no cable modem vendor** command being used to remove the association between Cisco and an OUI of 00:0A:42. If any CMs exist with that OUI, the **show cable modem vendor** command will display the OUI ("00:0A:42") as the vendor name.

```
Router(config)# no cable modem vendor 00:0A:42
Router(config)#
```

**Related Commands**

| Command                        | Description                                                                                             |
|--------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>show cable modem vendor</b> | Displays the vendor name or Organizational Unique Identifier (OUI) for the CMs on each cable interface. |

# cable modulation-profile

To define a modulation profile for use on the router, use the **cable modulation-profile** command in global configuration mode. To remove the entire modulation profile or to reset a default profile to its default values, use the **no** form of this command.

## DOCSIS 1.0 and 1.1 Mixed Mode:

```
cable modulation-profile profile { mix | qam-16 | qpsk | robust-mix }
```

```
no cable modulation-profile profile { iuc | mix | qam-16 | qpsk | robust-mix }
```

```
cable modulation-profile profile iuc fec-tbytes fec-len burst-len guard-t mod scrambler seed diff
pre-len last-cw uw-len
```

## DOCSIS 1.x/2.0 Mixed Mode:

```
cable modulation-profile profile { mix-high | mix-low | mix-mid | mix-qam | qam-16 | qpsk |
robust-mix-high | robust-mix-mid | robust-mix-qam }
```

```
no cable modulation-profile profile { iuc | mix-high | mix-low | mix-mid | mix-qam | qam-16 |
qpsk | robust-mix-high | robust-mix-mid | robust-mix-qam }
```

```
cable modulation-profile profile iuc fec-tbytes fec-len burst-len guard-t mod scrambler seed diff
pre-len last-cw uw-len
```

## DOCSIS 2.0 A-TDMA Mode:

```
cable modulation-profile profile { mix-high | mix-low | mix-mid | mix-qam | qam-8 | qam-16 |
qam-32 | qam-64 | qpsk | robust-mix-high | robust-mix-low | robust-mix-mid }
```

```
no cable modulation-profile profile { iuc | mix-high | mix-low | mix-mid | mix-qam | qam-8 |
qam-16 | qam-32 | qam-64 | qpsk | robust-mix-high | robust-mix-low | robust-mix-mid }
```

```
cable modulation-profile profile iuc fec-tbytes fec-len burst-len guard-t mod scrambler seed diff
pre-len last-cw uw-len
```

## Cisco IOS Release 12.2(33)SCC and Later

## DOCSIS 2.0 A-TDMA Mode and DOCSIS 2.0 S-CDMA Mode:

```
cable modulation-profile profile { mix-high | mix-low | mix-mid | mix-qam | qam-16 | qpsk |
robust-mix-high | robust-mix-low | robust-mix-mid }
```

```
no cable modulation-profile profile { iuc | mix-high | mix-low | mix-mid | mix-qam | qam-16 |
qpsk | robust-mix-high | robust-mix-low | robust-mix-mid }
```

```
cable modulation-profile profile iuc fec-tbytes fec-len burst-len guard-t mod scrambler seed diff
pre-len last-cw uw-len
```

**Syntax Description**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>profile</i>         | <p>Specifies the modulation profile number. The valid values for the profile number depend on the cable interface being used and the upstream's mode of operation. See <a href="#">Table 11</a> for a list of valid ranges based on cable interface and modulation type.</p> <p>In Cisco IOS Release 12.2(15)CX and later releases, you can create a maximum of 10 profiles for each mode of operation, for a total of 30 profiles. In earlier software releases, you can create a maximum of 8 profiles only for DOCSIS 1.0 and DOCSIS 1.1 mode.</p> |
| <b>mix</b>             | (DOCSIS 1.0 and DOCSIS 1.1 mode only) Creates a default QPSK/16-QAM mix modulation profile where short and long grant bursts are sent using 16-QAM, while request, initial ranging, and station maintenance bursts are sent using QPSK). The burst parameters are set to their default values for each burst type.                                                                                                                                                                                                                                    |
| <b>mix-high</b>        | (DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 modes only) Creates a default QPSK/64-QAM modulation profile.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>mix-low</b>         | (DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 modes only) Creates a default QPSK/16-QAM modulation profile.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>mix-mid</b>         | (DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only) Creates a default QPSK/32-QAM modulation profile.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>mix-qam</b>         | (DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only) Creates a default 16-QAM/64-QAM modulation profile.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>qam-8</b>           | <p>(DOCSIS 2.0 A-TDMA mode only) Creates a default 8-QAM modulation profile.</p> <p>This modulation profile is available in hidden and internal mode only from Cisco IOS Release 12.2(33)SCC onwards.</p>                                                                                                                                                                                                                                                                                                                                             |
| <b>qam-16</b>          | Creates a default 16-QAM modulation profile.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>qam-32</b>          | <p>(DOCSIS 2.0 A-TDMA mode only) Creates a default 32-QAM modulation profile.</p> <p>This modulation profile is available in hidden and internal mode only from Cisco IOS Release 12.2(33)SCC onwards.</p>                                                                                                                                                                                                                                                                                                                                            |
| <b>qam-64</b>          | <p>(DOCSIS 2.0 A-TDMA mode only) Creates a default 64-QAM modulation profile.</p> <p>This modulation profile is available in hidden and internal mode only from Cisco IOS Release 12.2(33)SCC onwards.</p>                                                                                                                                                                                                                                                                                                                                            |
| <b>qpsk</b>            | Creates a default QPSK modulation profile.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>robust-mix</b>      | (DOCSIS 1.0 and DOCSIS 1.1 mode only) Creates a default QPSK/16-QAM modulation profile with a longer preamble that is more robust and more able to deal with noise on the upstream better than the <b>mix</b> profile.                                                                                                                                                                                                                                                                                                                                |
| <b>robust-mix-high</b> | (DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only) Creates a default QPSK/64-QAM mixed modulation profile with a longer preamble that is more robust and more able to deal with noise on the upstream better than the <b>mix-high</b> profile.                                                                                                                                                                                                                                                                                                   |
| <b>robust-mix-low</b>  | (DOCSIS 2.0 A-TDMA mode only) Creates a default QPSK/16-QAM modulation profile with a longer preamble that is more robust and better able to deal with noise on the upstream than the <b>mix-low</b> profile.                                                                                                                                                                                                                                                                                                                                         |
| <b>robust-mix-mid</b>  | (DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only) Creates a default QPSK/32-QAM modulation profile with a longer preamble that is more robust and better able to deal with noise on the upstream than the <b>mix-mid</b> profile.                                                                                                                                                                                                                                                                                                               |

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>robust-mix-qam</b>      | (DOCSIS 1.x/2.0 mixed mode only) Creates a default 16-QAM/64-QAM mixed modulation profile with a longer preamble that is more robust and better able to deal with noise on the upstream than the <b>mix-qam</b> profile.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>iuc</i>                 | <p>Interval usage code. Valid entries depend on the mode of operation:</p> <ul style="list-style-type: none"> <li>• If the upstream is configured for DOCSIS 1.0 and DOCSIS 1.1 modulation profiles, the valid values are <b>initial</b>, <b>long</b>, <b>request</b>, <b>reqdata</b>, <b>short</b>, or <b>station</b>.</li> <li>• If the upstream is configured for DOCSIS 1.x and DOCSIS 2.0 mixed modulation profiles, the valid values are <b>a-long</b>, <b>a-short</b>, <b>a-ugs</b>, <b>initial</b>, <b>long</b>, <b>request</b>, <b>reqdata</b>, <b>short</b>, or <b>station</b>.</li> <li>• If the upstream is configured for DOCSIS 2.0 A-TDMA modulation profiles, the valid values are <b>a-long</b>, <b>a-short</b>, <b>a-ugs</b>, <b>initial</b>, <b>long</b>, <b>request</b>, <b>reqdata</b>, <b>short</b>, or <b>station</b>.</li> </ul> <p>The <b>reqdata</b> burst type is included as a placeholder for scripts that might reference it, but the DOCSIS MAC scheduler on the Cisco CMTS does not use this type of burst.</p> <p>When you are using the <b>initial</b> and <b>station</b> bursts for DOCSIS 2.0 A-TDMA mode, <b>qam-8</b>, <b>qam-32</b>, and <b>qam-64</b> modulation profiles are available in hidden mode only.</p> |
| <i>preamble</i>            | (DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only, for <b>a-long</b> and <b>a-short</b> options) Specifies the preamble format. Valid values are <b>qpsk0</b> and <b>qpsk1</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>rs-interleave-depth</i> | (DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only, for <b>a-long</b> and <b>a-short</b> options) Specifies the RS interleave depth. The valid range is from 0 to 114.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>rs-interleave-block</i> | (DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only, for <b>a-long</b> and <b>a-short</b> options) Specifies the RS interleave block size. The valid range is from 18 to 2048.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>fec-tbytes</i>          | The number of bytes that can be corrected per FEC code word. For DOCSIS 1.0 and DOCSIS 1.1 mode, valid values are from 0 to 10 (decimal), where 0 means no FEC. For DOCSIS 2.0 A-TDMA mode, the valid values are from 0 to 16 (decimal), where 0 means no FEC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>fec-len</i>             | FEC code-word length. Valid values are from 16 to 253.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>burst-len</i>           | Maximum burst length in minislots. Valid values are from 0 to 255, where 0 means no limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>guard-t</i>             | Guard time in symbols. The time between successive bursts, with a range from 22 to 255. (In Cisco IOS Release 12.2(15)BC2 and earlier releases, the minimum guard time was 0 symbols, but we do not recommend using a guard time smaller than 22 symbols.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>mod</i>                 | <p>Modulation. Valid entries are <b>16qam</b> and <b>qpsk</b> for DOCSIS 1.0 and DOCSIS 1.1 upstreams. Valid entries are <b>8qam</b>, <b>16qam</b>, <b>32qam</b>, <b>64qam</b>, and <b>qpsk</b> for DOCSIS 2.0 upstreams.</p> <p>The <b>qam-8</b>, <b>qam-32</b>, and <b>qam-64</b> modulation profiles are available in hidden and internal modes only from Cisco IOS Release 12.2(33)SCC onwards.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>scrambler</i>           | Enable or disable scrambler. Valid entries are <b>scrambler</b> and <b>no-scrambler</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>seed</i>                | (Required if <b>scrambler</b> option used) Scrambler seed in hexadecimal format. Valid values are from 0x0 to 0x7FFF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                |                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>diff</i>    | Enable or disable differential encoding. Valid entries are <b>diff</b> and <b>no-diff</b> .<br><br>In DOCSIS 2.0 mode, differential encoding cannot be enabled for the 8-QAM, 32-QAM, and 64-QAM modulations.<br><br>The <b>qam-8</b> , <b>qam-32</b> , and <b>qam-64</b> modulation profiles are available in hidden and internal modes only from Cisco IOS Release 12.2(33)SCC onwards. |
| <i>pre-len</i> | Preamble length in bits. Valid values are from 2 to 256.                                                                                                                                                                                                                                                                                                                                  |
| <i>last-cw</i> | Handling of FEC for last code word. Valid entries are <b>fixed</b> for fixed code-word length and <b>shortened</b> for shortened last code word.                                                                                                                                                                                                                                          |
| <i>uw-len</i>  | Upstream unique word length. Enter <b>uw8</b> for 8-bit unique code words or <b>uw16</b> for 16-bit unique code words.                                                                                                                                                                                                                                                                    |

**Command Default**

Modulation profile 1 is defined as a **qpsk** Time Division Multiple Access (TDMA) profile.

In Cisco IOS Release 12.2(15)CX, Release 12.2(15)BC2 and later releases, additional modulation profiles are defined as the default mixed TDMA/A-TDMA profile and the default Advanced TDMA (A-TDMA) profile. See [Table 11](#) for a list of valid ranges based on cable interface and modulation type.

**Command Modes**

Global configuration (config)

**Command History**

| Release                         | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA                         | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 12.0(7)XR2                      | This command was supported.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 12.0(6)SC<br>and<br>12.1(3a)EC1 | The <b>mix</b> , <b>qpsk</b> , and <b>qam-16</b> options were added.                                                                                                                                                                                                                                                                                                                                                                                               |
| 12.2(8)BC2                      | Support was added for the Cisco uBR10012 router.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 12.2(11)CY                      | Support was added for the Cisco uBR-MC5X20S cable interface line card. This includes creating default modulation profile 21 for the card.                                                                                                                                                                                                                                                                                                                          |
| 12.2(15)CX                      | Support was added for the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line card, including support for DOCSIS 2.0 A-TDMA and mixed modulation profiles on this card.<br><br>The <b>robust</b> predefined modulation profiles were also added for all modes of operation. The robust profiles use a longer preamble to provide better handling of noise on the upstream, but they also consume more bandwidth at the PHY layer than the other profiles. |
| 12.2(15)BC2                     | Support was added for the Cisco uBR10-MC5X20S/U cable interface line cards, including support for DOCSIS 2.0 A-TDMA and mixed modulation profiles. Support for the IUC-11 burst profile (Advanced UGS, <b>a-ugs</b> ) was also added for mixed TDMA/A-TDMA modulation profiles.                                                                                                                                                                                    |
| 12.3BC                          | This command was integrated into Cisco IOS Release 12.3BC. Support was added for the Cisco uBR10-MC5X20H cable interface line card.                                                                                                                                                                                                                                                                                                                                |

| Release     | Modification                                                                                                                                                                                                              |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                        |
| 12.2(33)SCC | This command was modified. Moved <b>qam-8</b> , <b>qam-32</b> , and <b>qam-64</b> options to hidden and internal mode only. Support was added for Synchronous Code Division Multiple Access (S-CDMA) modulation profiles. |

### Usage Guidelines

A modulation profile is a collection of at least six burst profiles that are sent out in an upstream channel descriptor (UCD) message to configure a modem's transmit parameters.

You can use the **no cable modulation-profile** command to remove all modulation profiles except the default modulation profiles (1, 21, 41, 101, 121, 201, 221, 241, and 321, depending on the cable interface line cards being used). In the case of the default modulation profiles, the **no cable modulation-profile** command resets the default profile to its default values.

We recommend that you use the predefined profiles instead of manually specifying the individual bursts for a modulation profile. The predefined profiles are optimized for the default of 32 symbols per minislot for each particular modulation scheme. The **robust** predefined profiles use a longer preamble for better handling of noise on the upstream, but at the cost of consuming more PHY layer bandwidth than the other non-robust profiles.

If you want to manually specify the individual bursts, enter a line with all parameters for each upstream burst type. Then repeat this command for each burst type, which also must be fully specified. A profile with incomplete or missing bursts can cause unreliable operation or loss of modem connectivity.



#### Caution

Changes to modulation profiles causes changes to the physical layer. Because changing physical layer characteristics affects router performance and function, this task should be reserved for expert users who have a thorough understanding of DOCSIS systems and how each parameter affects the network.



#### Note

The **reqdata** burst type is included as a placeholder for SNMP scripts that might reference it, but it has no effect. You can use this command (and SNMP commands) to specify the **reqdata** types, but the DOCSIS MAC scheduler on the Cisco CMTS does not use this type of burst.

From Cisco IOS Release 12.2(33)SCC onwards, the **qam-8**, **qam-32**, and **qam-64** modulation profiles are available in hidden and internal modes only. When you are using the **initial** and **station** bursts for DOCSIS 2.0 A-TDMA mode, **qam-8**, **qam-32**, and **qam-64** modulation profiles are available in hidden mode only. However, these modulation profiles are available for **a-long**, **a-short**, **a-ugs**, **long**, **request**, **reqdata**, and **short**.

### Modulation Profile Ranges

The valid range for modulation profiles depends on the cable interface being used and the type of modulation profile being created. [Table 11](#) lists the valid ranges according to cable interface and modulation type.



**Table 11** Allowable Ranges for Modulation Profiles

| Cable Interface                                               | DOCSIS 1.X (TDMA)                | Mixed DOCSIS 1.X/2.0       | DOCSIS 2.0 (A-TDMA)     | DOCSIS 2.0 (S-CDMA)         |
|---------------------------------------------------------------|----------------------------------|----------------------------|-------------------------|-----------------------------|
| Cisco uBR7100 series                                          | 1 to 10 <sup>1</sup> , default=1 | N/A                        | N/A                     | N/A                         |
| Cisco uBR-MC16C                                               | 1 to 10, default=1               | N/A                        | N/A                     | N/A                         |
| Cisco uBR-MC16S                                               | 1 to 10, default=1               | N/A                        | N/A                     | N/A                         |
| Cisco uBR-MC28C                                               | 1 to 10, default=1               | N/A                        | N/A                     | N/A                         |
| Cisco uBR-MC5X20S,<br>Cisco uBR-MC5X20U,<br>Cisco uBR-MC5X20H | 21 to 30, default=21             | 121 to 130,<br>default=121 | 221 to 230, default=221 | 321 to 330 (default is 321) |
| Cisco uBR-MC16U/X,<br>Cisco uBR-MC28U/X                       | 41 to 50, default=41             | 141 to 150,<br>default=141 | 241 to 250, default=241 | N/A                         |

1. Only 8 modulation profiles are supported in Cisco IOS software releases before 12.2(15)BC1, so in these releases the valid range is from 1 to 8.

### DOCSIS 1.0 and DOCSIS 1.1 Support

For DOCSIS 1.0 and 1.1 cable modems, the following burst types are required: request, request data, initial maintenance, station maintenance, short grant, and long grant. You must issue the **cable modulation-profile** command six times for each individual burst type to correctly create a new modulation profile.

The three default profiles can be used to quickly create modulation profiles, without having to specify the parameters for each individual burst: **mix**, **qpsk**, and **qam-16**. The burst parameters for the request, initial, station maintenance, short, and long bursts are set to their default values for each burst type. (The **reqdata** burst type is not created when using the default modulation profiles because it is not used by the MAC scheduler.)

The default profiles allow basic profiles to be implemented for initial network connectivity. As the characteristics of a cable plant become better known, the profiles can then be adjusted accordingly.



#### Note

Do not use the **qam-16** mode unless you have verified that your cable plant can support that modulation profile. Most cable plants should instead use the **qpsk** or **mix** modulation profile for the primary profile.



#### Caution

Turning the scrambler off can cause packet loss and is used only in lab testing environments.

Errors or incompatible configurations in the burst profiles cause cable modems to drop connectivity, to drop short or long data packets, or to fail to connect to the network. It is possible to build a burst profile set for which no implementation of a DOCSIS receiver is capable of receiving the modem's transmission.

Data rates of 160 Ksymbol/sec and 2560 Ksymbol/sec are highly sensitive to unique word length, preamble length, and FEC sizing. Incorrect choices for these values can cause poor, or no, connectivity at these symbol rates.

### DOCSIS 2.0 Support

Cisco IOS Release 12.2(11)CY, 12.2(15)BC1, 12.3BC, 12.2(33)SCA, 12.2(33)SCC, and later releases support 10 modulation profiles for each of the three DOCSIS modes (DOCSIS 1.X, DOCSIS 2.0, and mixed mode), for a total maximum of 30 modulation profiles. In addition, the router also creates several default modulation profiles (1, 21, 41, 101, 121, 141, 201, 221, 241, and 321, depending on the cable interface line cards that are installed).

### Examples

The following example shows how to create a mixed modulation profile, using 16-QAM for the short and long grant bursts and QPSK for the request, initial ranging, and station maintenance bursts. The burst parameters are set to their default values for each burst type.

```
Router(config)# cable modulation-profile 8 mix
Router(config)# exit
```

```
Router# show cable modulation-profile 8
```

| Mod | IUC     | Type | Preamb<br>length | Diff<br>enco | FEC<br>T | FEC<br>CW | Scrambl<br>seed | Max<br>B | Guard<br>time | Last<br>CW | Scrambl | Preamb<br>offset |
|-----|---------|------|------------------|--------------|----------|-----------|-----------------|----------|---------------|------------|---------|------------------|
|     |         |      |                  |              | BYTES    | size      |                 | size     |               |            | short   |                  |
| 8   | request | qpsk | 64               | no           | 0x0      | 0x10      | 0x152           | 0        | 8             | no         | yes     | 0                |
| 8   | initial | qpsk | 128              | no           | 0x5      | 0x22      | 0x152           | 0        | 48            | no         | yes     | 0                |
| 8   | station | qpsk | 128              | no           | 0x5      | 0x22      | 0x152           | 0        | 48            | no         | yes     | 0                |
| 8   | short   | qam  | 144              | no           | 0x6      | 0x4B      | 0x152           | 6        | 8             | yes        | yes     | 0                |
| 8   | long    | qam  | 160              | no           | 0x8      | 0xDC      | 0x152           | 0        | 8             | yes        | yes     | 0                |

```
Router#
```



#### Note

The above example shows the default values for the burst parameters. The main differences in the default values between 16-QAM and QPSK bursts are in the Type and Preamble Length fields.

The following example shows how to define the burst parameters for profile 2 with the following parameters: 0 fec-tbytes, 16 kbytes fec-len, a burst-len of 1, a guard time of 8, a mod value of **qpsk**, scrambler enabled with a seed value of 152, differential encoding disabled, a preamble length of 64 bits, a fixed code-word length, and 8-bit unique words for upstream unique word length.

```
Router(config)# cable modulation-profile 2 request 0 16 1 8 qpsk scrambler 152 no-diff 64
fixed uw8
Router(config)# cable modulation-profile 2 reqdata 0 16 1 8 qpsk scrambler 152 no-diff 64
fixed uw8
Router(config)# cable modulation-profile 2 initial 5 34 0 48 qpsk scrambler 152 no-diff
128 fixed uw16
Router(config)# cable modulation-profile 2 station 5 34 0 48 qpsk scrambler 152 no-diff
128 fixed uw16
Router(config)# cable modulation-profile 2 short 6 75 6 8 16qam scrambler 152 no-diff 144
fixed uw8
Router(config)# cable modulation-profile 2 long 8 220 0 8 16qam scrambler 152 no-diff 160
fixed uw8
```



#### Note

You must create all of the bursts (request, initial, station, short and long) for this modulation profile, using the **cable modulation-profile** command. The **reqdata** burst is optional.

The following example shows an example of a DOCSIS 1.X/DOCSIS 2.0 mixed modulation profile:

```
Router# configure terminal
Router(config)# cable modulation-profile 142 request 0 16 0 8 qpsk scrambler 152 no-diff
64 fixed uw8
```

```

Router(config)# cable modulation-profile 142 initial 5 34 0 48 qpsk scrambler 152 no-diff
32 fixed uw16
Router(config)# cable modulation-profile 142 station 5 34 0 48 qpsk scrambler 152 no-diff
32 fixed uw16
Router(config)# cable modulation-profile 142 short 5 75 6 8 qpsk scrambler 152 no-diff 72
shortened uw8
Router(config)# cable modulation-profile 142 long 8 220 0 8 qpsk scrambler 152 no-diff 80
shortened uw8
Router(config)# cable modulation-profile 142 a-short qpsk0 0 18 5 99 10 8 64qam scrambler
152 no-diff 128 shortened uw8
Router(config)# cable modulation-profile 142 a-long qpsk0 0 18 15 200 0 8 64qam scrambler
152 no-diff 128 shortened uw8
Router(config)#

```

The following example shows an example of a DOCSIS 2.0 A-TDMA modulation profile:

```

Router# configure terminal
Router(config)# cable modulation-profile 242 request qpsk0 0 0 0 16 0 8 qpsk scrambler 152
no-diff 64 fixed uw8
Router(config)# cable modulation-profile 242 initial qpsk0 0 0 5 34 0 48 qpsk scrambler
152 no-diff 32 fixed uw16
Router(config)# cable modulation-profile 242 station qpsk0 0 0 5 34 0 48 qpsk scrambler
152 no-diff 32 fixed uw16
Router(config)# cable modulation-profile 242 short qpsk0 0 0 5 75 6 8 qpsk scrambler 152
no-diff 72 shortened uw8
Router(config)# cable modulation-profile 242 long qpsk0 0 0 8 220 0 8 qpsk scrambler 152
no-diff 80 shortened uw8
Router(config)# cable modulation-profile 242 a-short qpsk0 0 18 5 99 10 8 64qam scrambler
152 no-diff 128 shortened uw8
Router(config)# cable modulation-profile 242 a-long qpsk0 0 18 15 200 0 8 64qam scrambler
152 no-diff 128 shortened uw8
Router(config)#

```

The following example shows an example of a DOCSIS 2.0 S-CDMA modulation profile:

```

Router# configure terminal
Router(config)# cable modulation-profile 324 request 0 16 10 16qam scrambler 152 no-diff
64 fixed qpsk0 spreader 12 12 no-tcm
Router(config)# cable modulation-profile 324 initial 0 16 10 16qam scrambler 152 no-diff
64 fixed qpsk0 off-spreader 12 12 no-tcm
Router(config)# cable modulation-profile 324 station 0 16 10 16qam scrambler 152 no-diff
64 fixed qpsk0 off-spreader 12 12 no-tcm
Router(config)# cable modulation-profile 324 a-short 0 16 10 16qam scrambler 152 no-diff
64 fixed qpsk0 off-spreader 12 12 no-tcm
Router(config)# cable modulation-profile 324 a-long 16 10 16qam scrambler 152 no-diff 64
fixed qpsk0 off-spreader 12 12 no-tcm
Router(config)# cable modulation-profile 324 a-ugs 16 10 16qam scrambler 152 no-diff 64
fixed qpsk0 off-spreader 12 12 no-tcm
Router(config)#

```

See the **show cable modulation-profile** command for a description of the output display fields.

## Related Commands

| Command                                  | Description                                        |
|------------------------------------------|----------------------------------------------------|
| <b>cable upstream modulation-profile</b> | Assigns a modulation profile to an interface.      |
| <b>show cable modulation-profile</b>     | Displays a modulation profile group's information. |

# cable modulation-profile global-scheme

To define a global modulation profile for use on the router, use the **cable modulation-profile global-scheme** command in global configuration mode. To remove the newly created modulation profile or to reset to the legacy profile mode, use the **no** form of this command.

```
cable modulation-profile global-scheme profile
no cable modulation-profile global-scheme
```

|                    |         |                                                                                         |
|--------------------|---------|-----------------------------------------------------------------------------------------|
| Syntax Description | profile | Modulation profile number. The valid values for the profile number range from 1 to 400. |
|--------------------|---------|-----------------------------------------------------------------------------------------|

|                 |                                                              |
|-----------------|--------------------------------------------------------------|
| Command Default | The global modulation profile scheme is disabled by default. |
|-----------------|--------------------------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCC | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | Using the global modulation profile scheme, you can assign any number between 1 to 400 to any modulation profiles. It eliminates the number space restriction and increases the number of modulation profiles that can be created per DOCSIS mode. The global modulation profile mode allows you to create and configure DOCSIS 3.0 channel type 4SR ( <b>scdma-d3</b> ). When an upstream DOCSIS mode is changed to <b>scdma-d3</b> , it is initially assigned to the system created default modulation profile as shown in <a href="#">Table 12</a> . |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                             |                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Note | Though you can assign any number between 1 to 400 to any modulation profile, the default modulation profile number assigned to an upstream channel for a given channel type will remain the same. That is, modulation profile numbers 21, 121, 221, 321, and 381 will be applicable for TDMA, mixed, A-TDMA, S-CDMA, and DOCSIS 3.0 S-CDMA channel types. |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

All the existing and previously defined modulation profiles are converted to the new format. However, all the newly created modulation profiles, which are outside of the legacy number space range, are lost when you revert to the legacy modulation profile.

|                                                                                             |                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Note | The default profiles cannot be deleted. Using the <b>no cable modulation global</b> command on the default profiles resets them to their original, default values. |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Modulation Profile Ranges

The valid range for modulation profiles depends on the cable interface being used and the type of modulation profile being created.

Table 12 lists the valid ranges according to cable interface and modulation type:

**Table 12 Allowable Ranges for Modulation Profiles**

| Cable Interface    | DOCSIS 2.0 (S-CDMA)         | DOCSIS 3.0 (S-CDMA)       |
|--------------------|-----------------------------|---------------------------|
| Cisco UBR-MC20X20V | 321 to 330 (default is 321) | 1 to 400 (default is 381) |

### Examples

The following example shows how to create a global modulation profile scheme:

```
Router(config)# cable modulation-profile global-scheme
```

### Related Commands

| Command                                  | Description                                         |
|------------------------------------------|-----------------------------------------------------|
| <b>cable upstream modulation-profile</b> | Assigns a modulation profile to an interface.       |
| <b>show cable modulation-profile</b>     | Displays modulation profile information of a group. |

# cable monitor

To enable the forwarding of selected packets on the cable interface to an external LAN analyzer, use the **cable monitor** command in cable interface configuration mode. To disable this function, use the **no** form of this command.

```
cable monitor [incoming | outbound] [timestamp]
interface interface {slot/{subslot | bay}/port} [access-list {name | number}] | [mac-address
address] | [sid sid-number] | [upstream number]
[packet-type {data docsis | data ethernet | mac [type type] }]
```

```
cable monitor outbound downstream {modular-cable | integrated-cable | wideband-cable}
slot/{subslot | bay}/controller:channel
```

```
no cable monitor
```

| Syntax Description                             |                                                                                                                                                                                                                                                                                      |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>incoming</b>                                | Forwards only packets being received on the upstream.                                                                                                                                                                                                                                |
| <b>outbound</b>                                | Forwards only packets being transmitted on the downstream.                                                                                                                                                                                                                           |
| <b>timestamp</b>                               | Enables packet time-stamping by appending a four-byte value to the forwarded packets. The timestamp value is in hundredths of a second.                                                                                                                                              |
| <b>interface</b> <i>interface</i>              | Specifies the WAN interface to which an external LAN analyzer is attached, and to which packets should be forwarded.<br><br><i>interface</i> —Specifies the interfaces such as Ethernet, Fast Ethernet, Gigabit Ethernet, or Ten Gigabit Ethernet interface.                         |
| <i>slot</i>                                    | Slot where the line card resides.<br><br><ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>• Cisco uBR7100 series router—The valid value is 1.</li> </ul> |
| <i>subslot</i>   <i>bay</i>                    | (Cisco uBR10012 only) Secondary subslot of the cable interface line card or bay of the SPA. The valid subslot values are 0 or 1 for the cable line card. Valid values for bay are from 0 to 3.                                                                                       |
| <i>port</i>                                    | Specifies the WAN interface number.                                                                                                                                                                                                                                                  |
| <b>access-list</b> <i>name</i>   <i>number</i> | (Optional) Specifies the IP access list name or number (1 to 2699).                                                                                                                                                                                                                  |
| <b>mac-address</b> <i>address</i>              | (Optional) Specifies the MAC address of the device being monitored.                                                                                                                                                                                                                  |
| <b>sid</b> <i>sid-number</i>                   | (Optional) Specifies the service ID for the packets that should be forwarded (1 to 16384).<br><br><b>Note</b> This option is supported only in Cisco IOS releases that support DOCSIS 1.1 operations.                                                                                |
| <b>upstream</b> <i>number</i>                  | (Optional) Specifies the upstream interface. Valid values for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards range from 0 to 3                                                                                                                                               |
| <b>packet-type</b>                             | (Optional) Specifies whether data or MAC packets are forwarded.                                                                                                                                                                                                                      |

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>data docsis</b>         | Specifies that complete DOCSIS packets (both the DOCSIS header and the complete Ethernet frame) should be forwarded.<br><br><b>Note</b> Enabling this option can result in %LINK-4-TOOBIG messages being generated if the original Ethernet frame is at or near the maximum Ethernet size of 1500 bytes. This is because this option adds additional bytes (the DOCSIS header) to the Ethernet frame, which can result in a total frame size that exceeds the maximum size that is allowed for standard Ethernet frames.                                                                                                                                                                                                                                  |
| <b>data ethernet</b>       | Specifies that the DOCSIS header should be stripped from the packet and that only the Ethernet frame should be forwarded.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>mac [type type]</b>     | Specifies that only DOCSIS MAC-layer packets should be forwarded. If you are using the <b>sid</b> option, you can also optionally specify the <b>type</b> option with one of the following keywords to indicate that only the specific type of MAC-layer traffic should be forwarded:<br><br><b>dsa</b> —Dynamic service addition<br><b>dsc</b> —Dynamic service change<br><b>dsd</b> —Dynamic service deletion<br><b>map-grant</b> —Grants<br><b>map-req</b> —Requests                                                                                                                                                                                                                                                                                   |
| <b>outbound downstream</b> | Enables cable monitor on the specified downstream interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>controller: channel</i> | <i>controller:channel</i> —Identifies the controller. <ul style="list-style-type: none"> <li>Valid range for Cisco uBR-MC3GX60V line card is from 0 to 2. <ul style="list-style-type: none"> <li>RF channel—The valid range is from 0 to 23.</li> <li>Bonding group—The valid range is from 0 to 31.</li> </ul> </li> <li>Valid range for Cisco UBR-MC20X20 line card is 0 to 4. <ul style="list-style-type: none"> <li>RF channel—The valid range is from 0 to 3.</li> <li>Bonding group—The valid range is from 0 to 5.</li> </ul> </li> <li>Valid value for Cisco Wideband SPA is 0. <ul style="list-style-type: none"> <li>RF channel—The valid range is from 0 to 23.</li> <li>Bonding group—The valid range is from 0 to 31.</li> </ul> </li> </ul> |

**Command Default** Both upstream (**incoming**) and downstream (**outbound**) traffic is forwarded.

**Command Modes** Interface configuration—cable interface only (config-if)

| Command History | Release    | Modification                                                         |
|-----------------|------------|----------------------------------------------------------------------|
|                 | 12.1(3a)EC | This command was introduced.                                         |
|                 | 12.1(4)CX  | The <b>sid</b> option was added for DOCSIS 1.1 support.              |
|                 | 12.2(4)XF  | Support was added for the Cisco uBR10012 universal broadband router. |
|                 | 12.2(4)BC1 | Support was added to the Release 12.2 BC train.                      |

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                           |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | Supports the Cisco MC5x20U-D broadband processing engine (BPE) and the Cisco MC28U cable interface line card.                                                                                                                                                                                                                                                          |
| 12.3(17a)BC | <ul style="list-style-type: none"> <li>Access Control Lists are now supported on the Cisco uBR-MC5X20U/D and Cisco uBR-MC28U cable interface line cards</li> <li>Unconditional downstream sniffing now enables downstream packets to be monitored, either for MAC or data packets. This enhancement supports both DOCSIS and Ethernet packet encapsulation.</li> </ul> |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                                                                     |
| 12.2(33)SCB | Support was added for the Ten Gigabit Ethernet interface type.                                                                                                                                                                                                                                                                                                         |
| 12.2(33)SCE | Support was added for the Cisco UBR-MC3XG60V line cards.                                                                                                                                                                                                                                                                                                               |

### Usage Guidelines

The **cable monitor** command allows an external LAN packet analyzer to monitor inbound and outbound data packets for specific types of traffic between the Cisco CMTS and the CMs on a cable interface. This feature enables the CMTS administrator to analyze traffic problems with customer data exchanges.

The interface used for forwarding packets can be used only for the external LAN analyzer; and cannot be used for other purposes. For complete information on configuring and using this feature, see the *Cable Monitor for the Cisco CMTS* chapter in the *Cisco CMTS Feature Guide* or the *Cisco IOS CMTS Cable Software Configuration Guide*, available on Cisco.com.



#### Note

The **cable monitor outbound downstream** command can be enabled:

- only one mac-domain on a line card at a time
- for one modular-cable or integrated-cable interface per line card at one time
- for one wideband-cable interface per line card at one time



#### Tip

One possible software utility you can use for decoding the DOCSIS MAC frames is Wireshark software, which is available for Windows and Unix systems at <http://www.wireshark.org>.

### Associated Features

The **cable monitor** command is used to configure the following features:

- [Cable Monitor and Intercept Features on the Cisco CMTS Routers](#)



**Examples**

The following example shows how to configure the Cisco CMTS so that it monitors incoming MAC-layer packets for the CM with the MAC address of 0123.4567.89ab and forwards copies of the packets to the LAN analyzer on the Ethernet interface in slot 1, port 2:

```
Router(config-if)# cable monitor incoming interface e1/2 mac-address 0123.4567.89ab
packet-type mac
```

The following example shows how to configure a Cisco CMTS running DOCSIS 1.1 software so that it monitors incoming MAC-layer packets of type DSA for the CM identified by SID 173 and forwards copies of the packets to the LAN analyzer on the Ethernet interface in slot 1, port 2:

```
Router(config-if)# cable monitor incoming interface e1/2 sid 173 packet-type mac type dsa
```

The following example shows how to configure a mac domain to monitor all packets on a modular primary downstream and forward copies of the packets to a Gigabit Ethernet interface:

```
Router# configure terminal
Router(config)# interface cable 5/0/0
Router(config-if)# cable monitor outbound downstream Modular-Cable 5/1/0:21
Router(config-if)# cable monitor outbound interface GigabitEthernet3/0/0
Router(config-if)# exit
```

The following example shows how to configure a mac domain to monitor all packets on a particular downstream bonding group and forward copies of the packets to a Gigabit Ethernet interface:

```
Router# configure terminal
Router(config)# interface cable 5/0/0
Router(config-if)# cable monitor outbound downstream Wideband-Cable 5/1/2:30
Router(config-if)# cable monitor outbound interface GigabitEthernet3/0/0
Router(config-if)# exit
```

The following example shows how to configure a mac domain to monitor all packets on a particular bonding group destined to a specific modem and forward copies of the packets to a Gigabit Ethernet interface:

```
Router# configure terminal
Router(config)# interface cable 5/0/0
Router(config-if)# cable monitor outbound downstream Wideband-Cable 5/1/2:30
Router(config-if)# cable monitor outbound interface GigabitEthernet3/0/0 mac-address
0123.4567.89ab
Router(config-if)# exit
```

**Related Commands**

| Command                             | Description                                                                                                                                             |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable intercept</b>              | Allows the CMTS to forward all traffic to and from a particular CM to a data collection server located at particular User Datagram Protocol (UDP) port. |
| <b>show interface cable monitor</b> | Displays monitor flow information on the upstream port.                                                                                                 |

# cable mrc-mode

To enable Multiple Receive Channel (MRC) mode for a Media Access Control (MAC) interface during or after the cable modem (CM) registration, use the **cable mrc-mode** command in cable interface configuration mode. To disable this configuration, use the **no** form of this command.

**cable mrc-mode**

**no cable mrc-mode**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The MRC mode is enabled by default on a downstream bonding capable cable interface line card.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                                                  |
|-------------|---------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

## Usage Guidelines

When you enable or disable the MRC mode, cable modems switch the operation to or from the MRC mode only after the reinitialization of cable modems. You cannot enable the MRC mode on a non-upstream bonding capable cable interface line card.

## Examples

The following example shows how to enable the MRC mode for a MAC interface:

```
Router# configure terminal
Router(config)# interface cable 7/1/0
Router(config-if)# cable mrc-mode
```

## Related Commands

| Command               | Description                                                                       |
|-----------------------|-----------------------------------------------------------------------------------|
| <b>cable mtc-mode</b> | Enables or disables the Multiple Transmit Channel mode (MTC) for a MAC interface. |

# cable mtc-mode

To enable Multiple Transmit Channel (MTC) mode for a Media Access Control (MAC) interface during or after the cable modem (CM) registration, use the **cable mtc-mode** command in cable interface configuration mode. To disable this configuration, use the **no** form of this command.

**cable mtc-mode** [required-attribute]

**no cable mtc-mode** [required-attribute]

## Syntax Description

|                           |                                                    |
|---------------------------|----------------------------------------------------|
| <b>required-attribute</b> | Specifies the per-CM basis MTC mode configuration. |
|---------------------------|----------------------------------------------------|

## Command Default

The MTC mode is enabled by default with the required attribute. With this default configuration, the Cisco CMTS router enables the MTC mode on a per-CM basis by looking at the configuration file of each cable modem.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

Multiple Transmit Channel mode is a CM capability that enables CMs to send upstream traffic on multiple upstream channels. You can enable the MTC mode on a cable interface line card in two ways:

- MTC mode on a per-CM basis—By default, the MTC mode is enabled with the required attribute. With this default configuration, the Cisco CMTS router enables MTC mode on a per-CM basis by looking at each CM's configuration file. When the CM configuration file has the bonded-bit (bit-0) on in type-length-value (TLV) 43.9.3 (cable modem upstream required attribute mask), the Cisco CMTS router lets the CM come online in the MTC mode. If the CM configuration file does not have the bonded-bit on, the CM comes online in non-MTC mode.
- MTC mode for all cable modems in a MAC domain—The MTC mode for all cable modems in a MAC domain is disabled by default on an upstream bonding capable cable interface line card. You can enable the MTC mode for all cable modems in a MAC domain using the **cable mtc-mode** command in cable interface configuration mode.



### Note

You do not have to use the **required-attribute** keyword to enable the MTC mode for all cable modems in a MAC domain. You can use the **no** form of this command with the **required-attribute** keyword to disable the default per-CM basis configuration.

You cannot enable the MTC mode on a non-upstream bonding capable cable interface line card.

---

**Examples**

The following example shows how to enable the MTC mode for all cable modems in a MAC domain:

```
Router# configure terminal
Router(config)# interface cable 7/1/0
Router(config-if)# cable mtc-mode
```

---

**Related Commands**

| Command               | Description                                                          |
|-----------------------|----------------------------------------------------------------------|
| <b>cable mrc-mode</b> | Enables the Multiple Receive Channel mode (MRC) for a MAC interface. |

# cable multicast auth enable default-action

To enable cable multicast authorization profile and set the maximum sessions limit, use the **cable multicast auth enable default-action** command in global configuration mode. To disable a cable multicast authorization profile, use the **no** form of this command.

**cable multicast auth enable default-action** {*permit* | *deny*} **max-sessions** [*limit*]

**no cable multicast auth enable**

|                    |               |                                                                            |
|--------------------|---------------|----------------------------------------------------------------------------|
| Syntax Description | <i>permit</i> | Specifies packets to forward.                                              |
|                    | <i>deny</i>   | Specifies packets to reject.                                               |
|                    | <i>limit</i>  | Specifies the maximum number of dynamic multicast sessions allowed per CM. |
|                    |               | No default value.<br>Max value allowed is 65535.                           |

**Command Default** Cable multicast authorization is disabled.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Usage Guidelines** This command is used to enable cable multicast authorization profile feature and defines the default value. However, it does not define the actual authorization files.

**Examples** The following example shows how to enable the default multicast authorization profile:

```
Router(config)# cable multicast auth enable default-action deny max-sessions 10
```

| Related Commands | Command                                           | Description                                                                                                       |
|------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable multicast authorization profile-name</b> | Defines the cable multicast authorization profile.                                                                |
|                  | <b>show cable multicast authorization</b>         | Displays the list of defined multicast authorization profiles and all CMs associated with corresponding profiles. |

# cable multicast auth profile-name

To define a cable multicast authorization profile, and to set it as the default profile, use the **cable multicast auth profile-name** command in global configuration mode. To disable a cable multicast authorization profile, use the **no** form of this command.

**cable multicast auth profile-name** *name* [**default**]

**no cable multicast auth profile-name** *name* [**default**]

## Syntax Description

|                |                                                                                      |
|----------------|--------------------------------------------------------------------------------------|
| <i>name</i>    | Specifies the name of the authorization profile to be used.                          |
| <b>default</b> | (Optional) Specifies that the profile name should be treated as the default profile. |

## Command Default

Cable multicast authorization is disabled.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                   |
|-------------|------------------------------------------------|
| 12.2(33)SCB | This command was introduced.                   |
| 12.2(33)SCC | The optional <b>default</b> keyword was added. |

## Usage Guidelines

This command defines a cable multicast authorization profile, and optionally sets it as the default profile. If the **default** keyword is not used while modifying the profile, the profile is automatically converted to a non-default profile. Similarly, if the **default** keyword is added while modifying a profile, the profile is treated as a default profile.

## Examples

The following example shows how to use the selected multicast authorization profile:

```
Router(config)# cable multicast auth profile-name GOLD default
```

## Related Commands

| Command                                                    | Description                                                                                                                                                              |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable multicast authorization enable default-action</b> | This command enables the cable multicast authorization features. If the multicast authorization feature is disabled, all defined authorization profiles are ineffective. |
| <b>match rule</b>                                          | This command configures the match rule, rule priority and related action in the selected cable multicast authorization profile                                           |

# cable multicast group-encryption

To configure a group encryption profile for a multicast group, use the **cable multicast group-encryption** command in global configuration mode. To disable a group encryption profile, use the **no** form of this command.

**cable multicast group-encryption** *number* **algorithm 56bit-des**

**no cable multicast group-encryption** *number* **algorithm 56bit-des**

## Syntax Description

|                            |                                                                                                            |
|----------------------------|------------------------------------------------------------------------------------------------------------|
| <i>number</i>              | Specifies the number of a specific cable multicast QoS group encryption profile. The valid range is 1–255. |
| <b>algorithm 56bit-des</b> | Specifies that the data encryption standard (DES) is 56 bits.                                              |

## Command Default

Cable multicast group encryption is disabled.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCA | This command was introduced. |

## Usage Guidelines

To apply encryption rules to a cable multicast QoS group, you must first enable and identify an encryption group.

## Examples

The following example enables encryption, identifies encryption group 12, and applies the encryption rule to QoS group 2:

```
Router(config)# cable multicast group-encryption 12 algorithm 56bit-des
Router(config)# cable multicast qos group 2 priority 7 global
Router(config-mqos)# group-encryption 12
```

## Related Commands

| Command                                         | Description                                                                 |
|-------------------------------------------------|-----------------------------------------------------------------------------|
| <b>cable multicast qos group</b>                | Specifies and configures a cable multicast QoS group.                       |
| <b>show interface bundle multicast-sessions</b> | Displays multicast session information for a specific virtual cable bundle. |
| <b>show interface cable multicast-sessions</b>  | Displays multicast session information for a specific cable interface.      |

# cable multicast group-qos

To configure a QoS profile for a QoS group, use the **cable multicast group-qos** command in global configuration mode. To disable a QoS profile, use the **no** form of this command.

**cable multicast group-qos** *number* *scn* *service-class-name* **control** {**single** | **aggregate** [**limit** *max-sessions*]}

**no cable multicast group-qos** *number* *scn* *service-class-name* **control** {**single** | **aggregate** [**limit** *max-sessions*]}

|                           |                                      |                                                                                                                                                                                                                           |
|---------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i>                        | Specifies the QoS profile number for the cable multicast QoS group. The valid range is 1–255. If a multicast group does not match the group QoS classifiers, a default group-QoS option is applied to the multicast flow. |
|                           | <i>scn</i> <i>service-class-name</i> | Specifies a service class name for the QoS profile.                                                                                                                                                                       |
|                           | <b>control</b>                       | Specifies the type of control to the service flow.                                                                                                                                                                        |
|                           | <b>single</b>                        | Specifies that a separate service flow is created for each session.                                                                                                                                                       |
|                           | <b>aggregate</b>                     | Specifies that service flows are grouped for sessions in the same multicast QoS group.                                                                                                                                    |
|                           | <b>limit</b> <i>max-sessions</i>     | (Optional) Specifies the Internet Group Management Protocol (IGMP) session limit for aggregate service flows. The valid range is 1–255.                                                                                   |
|                           |                                      |                                                                                                                                                                                                                           |

**Command Default** The QoS profile for a QoS group is not enabled.

**Command Modes** Global configuration (config)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCA    | This command was introduced. |

**Usage Guidelines** If a QoS profile number is not specified, a default QoS profile is applied. The default group QoS configuration creates a default multicast service flow for each cable interface that is used when a multicast session does not match any classifiers of a GC on the interface.

**Examples** The following example configures QoS profile 5 with a service name of name1 and a control of single to indicate that a separate service flow is created for each session. QoS profile 5 is then assigned to QoS group 2.

```
Router(config)# cable multicast group-qos 5 scn name1 control single
Router(config)# cable multicast qos group 2 priority 7 global
Router(config-mqos)# cable multicast group-qos 5
```



**Related Commands**

| Command                                         | Description                                                                 |
|-------------------------------------------------|-----------------------------------------------------------------------------|
| <b>cable multicast qos group</b>                | Specifies and configures a cable multicast QoS group.                       |
| <b>show interface bundle multicast-sessions</b> | Displays multicast session information for a specific virtual cable bundle. |
| <b>show interface cable multicast-sessions</b>  | Displays multicast session information for a specific cable interface.      |

# cable multicast group-qos default

To configure the service class name of the default multicast quality of service (MQoS) for the QoS profile, use the **cable multicast group-qos default** command in global configuration mode. To disable the service class name of the default MQoS for the QoS profile, use the **no** form of this command.

**cable multicast group-qos default scn *service-class-name* aggregate**

**no cable multicast group-qos default scn *service-class-name* aggregate**

## Syntax Description

|                                      |                                                                               |
|--------------------------------------|-------------------------------------------------------------------------------|
| <b>scn <i>service-class-name</i></b> | Specifies a service class name for the QoS profile.                           |
| <b>aggregate</b>                     | Specifies that service flows are grouped for sessions in the same MQoS group. |

## Command Default

The default MQoS profile is not configured.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCC1 | This command was introduced. |

## Usage Guidelines

If you configure the service class name with the DOCSIS Setup Gateway (DSG) tunnel when no default MQoS exists, the configuration is rejected and you are prompted to configure the default MQoS.

The CMTS selects the primary downstream channel to forward the multicast traffic when the default MQoS is configured and there is no matching MQoS group configuration. Otherwise, the wideband interface is used to forward the multicast traffic.



### Note

If you configure or unconfigure the default MQoS while the CMTS is sending multicast traffic, duplicate traffic is generated for approximately 3 minutes (or 3 times the query interval).

## Examples

The following example configures the default MQoS profile with the service class name name1.

```
Router(config)# cable multicast group-qos default scn name1 aggregate
```

## Related Commands

| Command                          | Description                                           |
|----------------------------------|-------------------------------------------------------|
| <b>cable multicast group-qos</b> | Configures a QoS profile for a QoS group.             |
| <b>cable multicast qos group</b> | Specifies and configures a cable multicast QoS group. |

| Command                                         | Description                                                                 |
|-------------------------------------------------|-----------------------------------------------------------------------------|
| <b>show interface bundle multicast-sessions</b> | Displays multicast session information for a specific virtual cable bundle. |
| <b>show interface cable multicast-sessions</b>  | Displays multicast session information for a specific cable interface.      |

# cable multicast mdf-disable

To disable Multicast DSID-based Forwarding (MDF) capability of all cable modems associated with a Cisco CMTS router, use the **cable multicast mdf-disable** command in global configuration mode. To enable MDF on the cable modem, use the **no** form of this command.

**cable multicast mdf-disable** [**wb-incapable-cm** | **dsg**]

**no cable multicast mdf-disable** [**wb-incapable-cm** | **dsg**]

## Syntax Description

|                        |                                                                                                                                 |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>wb-incapable-cm</b> | (Optional) Disables MDF on all DOCSIS 2.0 hybrid cable modems.                                                                  |
| <b>dsg</b>             | (Optional) Disables MDF capability of all DSG embedded cable modems, including DOCSIS 3.0 DSG and DOCSIS 2.0 DSG hybrid modems. |

## Command Default

By default, MDF is not always enabled on the cable modem because it is dependent on the cable modem hardware.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                                                                                                             |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCD3 | This command was introduced.                                                                                                                             |
| 12.2(33)SCE4 | The <b>wb-incapable-cm</b> keyword was added.                                                                                                            |
| 12.2(33)SCF2 | The <b>DSG</b> keyword was added, and behavior of the <b>wb-incapable-cm</b> keyword was changed to include only non-DSG DOCSIS 2.0 hybrid cable modems. |

## Usage Guidelines

In Cisco IOS Release 12.2(33)SCE4, the **wb-incapable-cm** keyword was added to the **cable multicast mdf-disable** command to disable MDF on all DOCSIS 2.0 hybrid cable modems, including DOCSIS 2.0 DSG embedded cable modems. In Cisco IOS Release 12.2(33)SCF2, the **wb-incapable-cm** keyword was changed to include only non-DSG DOCSIS 2.0 hybrid cable modems.

After disabling MDF capability, you must run **clear cable modem reset** command to bring all DSG embedded cable modems online.

## Examples

The following example shows how to disable MDF capability on all cable modems:

```
Router# configure terminal
Router(config)# cable multicast mdf-disable
```

The following example shows how to disable MDF capability of all non-DSG DOCSIS 2.0 hybrid cable modems:

```
Router# configure terminal
Router(config)# cable multicast mdf-disable wb-incapable-cm
```

The following example shows how to disable MDF capability of all DSG embedded cable modems:

```
Router# configure terminal
Router(config)# cable multicast mdf-disable dsg
```

### Associated Features

The **cable multicast mdf-disable** command is associated with the following feature:

- [DOCSIS 3.0 Multicast Support on the CMTS Routers](#)

### Related Commands

| Command                     | Description                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------|
| <b>ip multicast-routing</b> | Enables multicast routing globally or on a particular virtual routing and forwarding (VRF) interface. |

# cable multicast qos group

To specify and configure a cable multicast QoS group and enter multicast QoS configuration mode, use the **cable multicast qos group** command in global configuration mode. To disable a cable multicast QoS group, use the **no** form of this command.

**cable multicast qos group** *id* *priority value* [**global**]

**no cable multicast qos group** *id* *priority value* [**global**]

|                           |                       |                                                                                                                                                                                                                                                                      |
|---------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>id</i>             | Specifies the number of the cable multicast QoS group. The valid range is 1–255.                                                                                                                                                                                     |
|                           | <b>priority value</b> | Specifies the priority of the cable multicast QoS group. The valid range is from 1 to 255.<br><br>Starting with Cisco IOS Release 12.2(33)SCC, the valid range is from 1 to 63 and from 192 to 255. The values from 64 to 191 are used internally by the Cisco CMTS. |
|                           | <b>global</b>         | (Optional) Specifies that the multicast QoS group configuration is applied to all cable interfaces.                                                                                                                                                                  |
|                           |                       |                                                                                                                                                                                                                                                                      |

**Command Default** A cable multicast QoS group is not identified.

**Command Modes** Global configuration (config)

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCA    | This command was introduced. |

**Usage Guidelines** You must configure a group QoS profile (**cable multicast group-qos**) and a group encryption profile (**cable multicast group-encryption**) before you configure a cable multicast QoS group.

**Examples** The following example specifies multicast QoS group 2 with a priority of 6 and global application. Application ID, group encryption, group QoS, session range, ToS, and VRF options are configured for QoS group 2.

```
Router(config)# cable multicast qos group 2 priority 6 global
Router(config-mqos)# application-id 44
Router(config-mqos)# group-encryption 4
Router(config-mqos)# group-qos 3
Router(config-mqos)# session-range 224.10.10.01 255.255.255.254
Router(config-mqos)# tos 1 6 15
Router(config-mqos)# vrf name1
```

| Related Commands | Command                                         | Description                                                                                       |
|------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------|
|                  | <b>application-id</b>                           | Specifies an application type to allow admission control to be applied to a group configuration.  |
|                  | <b>cable multicast group-encryption</b>         | Configures a group encryption profile for a multicast group.                                      |
|                  | <b>cable multicast group-qos</b>                | Configures a group QoS profile for a multicast QoS group.                                         |
|                  | <b>session-range</b>                            | Identifies the multicast QoS group session range.                                                 |
|                  | <b>show interface bundle multicast-sessions</b> | Displays multicast session information for a specific virtual cable bundle.                       |
|                  | <b>show interface cable multicast-sessions</b>  | Displays multicast session information for a specific cable interface.                            |
|                  | <b>tos</b>                                      | Sets the type of service (ToS) low byte, high byte, and mask values within a multicast QoS group. |
|                  | <b>vrf</b>                                      | Specifies the name for a virtual routing and forwarding (VRF) instance.                           |

# cable multicast source

To configure a multicast session range for a PacketCable Multimedia (PCMM) multicast group on a Cisco CMTS router, use the **cable multicast source** command in global configuration mode. To disable this configuration, use the **no** form of this command.

**cable multicast source pcmm**

**no cable multicast source pcmm**

|                           |                                                                                                                                                                                                                                                                                                |                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>pcmm</b> Specifies the PCMM client and enters the multicast session range configuration mode.                                                                                                                                                                                               |                                                                      |
| <b>Command Default</b>    | None                                                                                                                                                                                                                                                                                           |                                                                      |
| <b>Command Modes</b>      | Global configuration (config)                                                                                                                                                                                                                                                                  |                                                                      |
| <b>Command History</b>    | <b>Release</b>                                                                                                                                                                                                                                                                                 | <b>Modification</b>                                                  |
|                           | 12.2(33)SCE                                                                                                                                                                                                                                                                                    | This command was introduced in Cisco IOS Release 12.2(33)SCE.        |
| <b>Examples</b>           | <p>The following example shows how to configure a multicast session range for a PCMM multicast group on a Cisco CMTS router:</p> <pre>Router# <b>configure terminal</b> Router(config)# <b>cable multicast source pcmm</b> Router(config-msrc)# <b>session-range 229.0.0.0 255.0.0.0</b></pre> |                                                                      |
| <b>Related Commands</b>   | <b>Command</b>                                                                                                                                                                                                                                                                                 | <b>Description</b>                                                   |
|                           | <b>show packetcable gate multimedia</b>                                                                                                                                                                                                                                                        | Displays information about the total number of PCMM multicast gates. |



# cable nd

To enable the IPv6 Neighbor Discovery (ND) Gleaning feature on the Cisco CMTS router, use the **cable nd** command in bundle interface configuration mode. To disable IPv6 ND gleaning, use the **no** form of this command.

**cable nd**

**no cable nd**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The IPv6 ND Gleaning feature is enabled by default.

## Command Modes

Bundle interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

The **cable nd** command adds a CPE (host behind a cable modem) to the Cisco CMTS subscriber database. This command does not impact the IPv6 ND protocol operation on the Cisco CMTS router.

The **cable ipv6 source-verify** and **cable nd** commands are not compatible with each other in Cisco IOS Release 12.2(33)SCE and later. You must disable IPv6 ND gleaning using the **no** form of the **cable nd** command before configuring IPv6 source verification using the DHCPv6 Leasequery feature.

## Examples

The following example shows how to configure IPv6 ND gleaning on the Cisco CMTS router:

```
Router# configure terminal
Router(config)# interface bundle 1
Router(config-if)# cable nd
```

## Associated Features

The **cable nd** command is associated with the [IPv6 ND Gleaning](#) feature.

## Related Commands

| Command                         | Description                                                           |
|---------------------------------|-----------------------------------------------------------------------|
| <b>cable ipv6 source-verify</b> | Enables source verification of IPv6 packets on the Cisco CMTS router. |





## Cable Commands: cable p through cable r

Revised: July 2012, OL-15510-16

### New Commands

| Command                                             | Cisco IOS Software Release |
|-----------------------------------------------------|----------------------------|
| <b>cable rf-bandwidth-percent</b>                   | 12.3(23)BC                 |
| <b>cable rcp-control</b>                            | 12.2(33)SCB                |
| <b>cable rcc template</b>                           | 12.2(33)SCB                |
| <b>cable rf-change-dampen-time</b>                  | 12.2(33)SCB                |
| <b>cable rsvp default-scن</b>                       | 12.2(33)SCB                |
| <b>cable rf-change trigger</b>                      | 12.2(33)SCB                |
| <b>cable privacy revocation crل skip-sig-check</b>  | 12.2(33)SCC                |
| <b>cable privacy revocation enable</b>              | 12.2(33)SCC                |
| <b>cable privacy revocation ocsپ skip-sig-check</b> | 12.2(33)SCC                |
| <b>cable privacy revocation skip-cم-cert</b>        | 12.2(33)SCC                |
| <b>cable privacy revocation timeout</b>             | 12.2(33)SCC                |
| <b>cable qos pre-registration</b>                   | 12.2(33)SCD2               |
| <b>cable privacy bپ-plus-policy</b>                 | 12.2(33)SCD5               |
| <b>cable rate-limit-algorithm min-plus-excess</b>   | 12.2(33)SCD5               |
| <b>cable rf-adapt timer</b>                         | 12.2(33)SCF                |
| <b>cable resiliency ds-bonding</b>                  | 12.2(33)SCG                |
| <b>cable queue-limit</b>                            | 12.2(33)SCG                |
| <b>cable rfswitch copy</b>                          | 12.2(33)SCG                |
| <b>cable rfswitch delete</b>                        | 12.2(33)SCG                |
| <b>cable rfswitch reboot</b>                        | 12.2(33)SCG                |
| <b>cable rfswitch set-active</b>                    | 12.2(33)SCG                |
| <b>cable resiliency traps-interval</b>              | 12.2(33)SCG2               |

**Modified Commands**

| <b>Command</b>                        | <b>Cisco IOS Software Release</b> |
|---------------------------------------|-----------------------------------|
| <b>cable rf-bandwidth-percent</b>     | 12.3(23)BC1                       |
| <b>cable rf-channel</b>               | 12.3(23)BC, 12.3(23)BC1           |
| <b>cable rf-bandwidth-percent</b>     | 12.2(33)SCB                       |
| <b>cable rf-channel</b>               | 12.2(33)SCB                       |
| <b>cable privacy bpi-plus-enforce</b> | 12.2(33)SCD5                      |
| <b>cable privacy bpi-plus-exclude</b> | 12.2(33)SCD5                      |
| <b>cable rf-change-trigger</b>        | 12.2(33)SCE4                      |
| <b>cable rf-channel</b>               | 12.2(33)SCH                       |

# cable power

To manually power a cable interface line card on or off on a Cisco uBR10012 router, use the **cable power** command in privileged EXEC mode.

**cable power** [**on** | **off**] *slot/card*

## Syntax Description

|                  |                                                                                                                                                                                                   |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>on</b>        | Turns on power to the specified cable interface line card.                                                                                                                                        |
| <b>off</b>       | Turns off power to the specified cable interface line card. Power to that particular card slot remains off until power is turned back on using the <b>cable power on</b> version of this command. |
| <i>slot/card</i> | Specifies the slot and card number for the desired cable interface card number. The valid range for <i>slot</i> is 5 to 8 and for <i>card</i> is 0 or 1.                                          |

## Defaults

Cable interface line cards are powered on by default when the card is inserted into the chassis slot.

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(4)BC1b | This command was introduced for the Cisco uBR10012 router.                                                         |
| 12.2(8)BC1  | This command is disabled if a working TCC+ card is not present in the Cisco uBR10012 router.                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

This command is typically not used during normal operations, but it can be used for lab, diagnostic, and troubleshooting purposes. For example, using this command to first power off and then power on a card is functionally equivalent to performing an online insertion and removal (OIR) of the card.

Be aware of the following points when using this command:

- Using the **cable power off** command is functionally equivalent to disconnect the cables from the card's upstream and downstream connectors and then removing the card from the chassis. When you use this command to turn off power to a card, the output for the **show interface cable** command for that card will display the message "Hardware is not present."



### Note

You can also use the LC Power off Status Reg and Line Card Presence Status Reg fields in the **show controllers clock-reference** command to determine whether a cable interface line card is actually present in the chassis and whether it has been powered on or off.

- Powering off a cable interface line card automatically drops all sessions with the cable modems that are using that card's upstreams and downstreams. Do not use this command on a live network unless this is what you intend.
- All cards are powered on when you upgrade to a new software image for the Cisco uBR10012 router, even if a card had previously been powered off using the **cable power off** command.
- You can turn power both on and off to a cable interface line card slot, even if a card is not physically present in the slot.
- This is the only CLI command that actually powers off a card. The **hw module reset** command appears to perform a similar function, but it performs only the equivalent of issuing the **shutdown** and **no shutdown** commands on the card.
- When power is turned off for a cable interface line card, the power to that card slot will remain off until the **cable power on** command is used to turn the power back on. If you insert a cable interface card in to a slot that had been previously powered down, you will have to use the **cable power on** command to turn on power before being able to use the card.
- This command requires that a working TCC+ card be present because the TCC+ card controls and monitors the operation of the cable interface line cards. In Cisco IOS Release 12.2(8)BC1 and later, this command is disabled if a working TCC+ card is not present in the router.



**Note** The Cisco uBR10012 router requires a working TCC+ card for normal operations. Using the router without a working TCC+ card is not a supported configuration.

## Examples

The following example shows how to power off the first cable interface card in a Cisco uBR10012 chassis (card 5, slot 0). It also shows the output from the **show interface cable** command, with a line that indicates that the hardware is not present.

```
router# cable power off 5/0
Line Card 5/0 is POWERED OFF
router# show int c5/0/0
Cable5/0/0 is down, line protocol is down
 Hardware is not present
 Hardware is UBR10012 CLC, address is 0005.00e0.2f14 (bia 0005.00e0.2f14)
 Internet address is 10.20.42.1/24
 MTU 1500 bytes, BW 27000 Kbit, DLY 1000 usec,
 reliability 255/255, txload 1/255, rxload 1/255
...
router#
```



**Note** The **show interface cable** command will not display output for a card that is not physically present, so if you can use the **show interface cable** command but it indicates that the hardware is not present, this usually means that power to the card has been turned off using the **cable power off** command.

The following example shows the error message that results when you attempt to power on or off a cable interface card that is not physically present in the chassis:

```
router# cable power off 6/1
Line Card 6/1 is not present
router#
```



**Note** Power is still turned on or off to a cable interface line card slot, even when the card is not physically present in that slot.

| Related Commands | Command                                 | Description                                                                                                                                            |
|------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>hw module reset</b>                  | Resets a line card, performing the equivalent of the <b>shutdown</b> , <b>no shutdown</b> commands.                                                    |
|                  | <b>show controllers clock-reference</b> | Displays status information from the TCC+ card, including whether a line card is physically present and whether power has been turned off to its slot. |
|                  | <b>show interface cable</b>             | Displays configuration and status information for a cable interface line card.                                                                         |
|                  | <b>show version</b>                     | Displays the basic configuration of the router, including whether an active TCC+ card is present.                                                      |
|                  | <b>shutdown</b>                         | Disables or enables the interface on a line card.                                                                                                      |

# cable pre-equalization exclude

To exclude a cable modem (CM) from pre-equalization during registration with the Cisco CMTS router, use the **cable pre-equalization exclude** command in global configuration mode. To remove exclusion for the specified cable modem or interface, use the **no** form of this command.

```
cable pre-equalization exclude {modem mac-addr | oui id}

no cable pre-equalization exclude {modem mac-addr | oui id}
```

|                    |                       |                                                                                                                      |
|--------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>modem mac-addr</b> | Excludes the cable modem with the specified MAC address from pre-equalization during cable modem registration.       |
|                    | <b>oui id</b>         | Excludes the specified Organizational Unique Identifier (OUI) from pre-equalization during cable modem registration. |

|                 |                                                                                                                                                   |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Command Default | Pre-equalization is disabled by default on a Cisco CMTS router, and for cable modems that have a valid and operational DOCSIS configuration file. |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(17a)BC | This command was introduced to the Cisco uBR10012 router and the Cisco uBR7246VXR router.                          |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

Use the **cable pre-equalization exclude** command to disable pre-equalization for DOCSIS 1.1 CMs that claim pre-equalization support but do not properly implement pre-equalization functions.

To enable pre-equalization, use the **cable upstream equalization-coefficient** interface configuration command. Pre-equalization starts when a cable modem that supports DOCSIS 1.1 or above sends the CMTS router a ranging request message indicating that pre-equalization is possible.

The following example of output from the **show cable modem verbose** command shows which modems are indicating pre-equalizer support during the DOCSIS registration process. In this example, the first two modems are capable of pre-equalization support, and the last two modems support DOCSIS 1.0, which does not support pre-equalization. You do not need to use the **cable pre-equalization exclude** command for DOCSIS 1.0 CMs.

```
Router# show cable modem verbose | include MAC Address|Equalizer
MAC Address : 0019.474a.c4b0
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
MAC Address : 0019.474a.c498
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
MAC Address : 0020.40dc.4ce4
Transmit Equalizer Support : {Taps/Symbol= 0, Num of Taps= 0}
MAC Address : 0020.4077.21a0
```



```
Transmit Equalizer Support : {Taps/Symbol= 0, Num of Taps= 0}
```

Exclusion is supported for a specified DOCSIS 1.1 cable modem, or for a specified OUI value for the entire interface. Removing the **cable pre-equalization exclude** configuration returns the cable modem or interface to normal pre-equalization processes during cable modem registration.

## Examples

The following example configures pre-equalization to be excluded for the specified cable modem. Pre-equalization data is not sent for the corresponding cable modem:

```
Router(config)# cable pre-equalization exclude modem 1111.2222.3333
```

The following example configures pre-equalization to be excluded for the specified OUI value of the entire interface. Pre-equalization data is not sent for the corresponding OUI value of the entire interface:

```
Router(config)# cable pre-equalization exclude oui 00.09.04
```

The following series of commands configures pre-equalization on the Cisco uBR10012 router with MC5X20U BPEs. On the PRE Console, configure the following commands.

```
Router# conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable pre-equalization exclude oui 00.09.04
Router(config)# end
Router# show run
Router# show running-config | inc oui
cable pre-equalization exclude oui 00.09.04
Router#
```

On the line card console for the same Cisco uBR10012 router, verify the configuration with the following command:

```
Linecard# show running-config | inc oui
cable pre-equalization exclude oui 00.09.04
```

The following series of commands configures pre-equalization on the Cisco uBR72436VXR router with MC28U cable interface line cards. On the Network Processing Engine (NPE) console, configure and verify with the following commands.

```
Router# conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable pre-equalization exclude oui 00.09.24
Router(config)# end
Router# show run
02:58:10: %SYS-5-CONFIG_I: Configured from console by consolen
Router# show running-config | inc oui
cable pre-equalization exclude oui 00.09.24
```

On the line card console for the same Cisco uBR7246VXR router, verify the configuration with the following command:

```
Linecard# show running-config | inc oui
cable pre-equalization exclude oui 00.09.24
```

After either of these exclusion methods for pre-equalization are configured, you can verify that all ranging messages do not include pre-equalization data. Use the following **debug** commands in global configuration mode:

- **debug cable range**
- **debug cable interface cx/x/x mac-addr**

**■ cable pre-equalization exclude**

Verify the ranging message for the non-excluded cable modems include pre-equalization data, and for the excluded cable modems, the ranging messages do not include such data.

The following example removes pre-equalization exclusion for the specified OUI and interface. This results in the cable modem or OUI to return to normal pre-equalization functions. Ranging messages resume sending pre-equalization data.

```
Router(config)# no cable pre-equalization exclude {modem mac-addr | oui id}
```

You can verify removal of this feature using the **debug cable interface** command.

**Related Commands**

| Command                      | Description                                        |
|------------------------------|----------------------------------------------------|
| <b>debug cable interface</b> | Verifies pre-equalization data and configurations. |
| <b>debug cable range</b>     | Verifies ranging messages for pre-equalization.    |

# cable primary-sflow-qos11 keep

To preserve the traffic counters for primary service flows after a CM that was provisioned for DOCSIS 1.1 quality of service (QoS) goes offline, use the **cable primary-sflow-qos11 keep** command in global configuration mode. To return to the default configuration and reset the counters to zero when a DOCSIS 1.1-provisioned CM goes offline, use the **no** form of this command.

**cable primary-sflow-qos11 keep {all | snmp-only}**

**no cable primary-sflow-qos11 keep**

## Syntax Description

|                  |                                                                                                                                                                                                               |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>       | Preserves all primary service flow traffic counters when a DOCSIS 1.1-provisioned CM goes offline. This includes the counters displayed by CLI commands and counters that are obtained through SNMP requests. |
| <b>snmp-only</b> | Preserves only the primary service flow traffic counters that are obtained through SNMP requests. The counters displayed by CLI commands are reset to zero when a DOCSIS 1.1-provisioned CM goes offline.     |

## Command Default

Primary service flow traffic counters are not preserved after a DOCSIS 1.1-provisioned CM goes offline (**no cable primary-sflow-qos11 keep**). Service-flow information is always preserved for DOCSIS 1.0-provisioned CMs, regardless of the configuration of this command.

## Command Modes

Global configuration

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(15)CX, | This command was introduced. |
| 12.2(15)BC2 |                              |

## Usage Guidelines

By default, when a CM that is provisioned for DOCSIS 1.1 quality of service (QoS) service flows goes offline, the CMTS deletes all service flow information, including traffic counters, that correspond to that CM. The **cable primary-sflow-qos11 keep** command preserves the service flow traffic counters after a DOCSIS 1.1-provisioned CM goes offline and then comes back online. This allows service providers to track the total usage of CMs over a period of time, regardless of the number of times the CMs go offline and reboot.



### Note

This command affects only CMs that are provisioned for DOCSIS 1.1 operations and that are currently online all cable interfaces on the Cisco CMTS. Information is not preserved for DOCSIS 1.1-provisioned CMs that went offline before this command was given. The service-flow information for CMs that are provisioned for DOCSIS 1.0 operations is always preserved, regardless of how this command is configured.

---

**Examples**

The following example shows how to preserve both the CLI and SNMP service flow counters when a DOCSIS 1.1-provisioned CM goes offline:

```
Router(config)# cable primary-sflow-qos11 keep all
Router(config)#
```

The following example shows how to preserve only the SNMP-based service flow counters when a DOCSIS 1.1-provisioned CM goes offline. The CLI-based counters are still reset to zero when this CM goes offline.

```
Router(config)# cable primary-sflow-qos11 keep snmp-only
Router(config)#
```

The following example shows how to disable this command and return to the default behavior, which is to reset all CLI-based and SNMP-based counters when a DOCSIS 1.1-provisioned CM goes offline.

```
Router(config)# no cable primary-sflow-qos11 keep
Router(config)#
```

---

**Related Commands**

| Command                          | Description                                                                                |
|----------------------------------|--------------------------------------------------------------------------------------------|
| <b>cable sflog</b>               | Enables service flow logging and configures the number and duration of entries in the log. |
| <b>show cable modem counters</b> | Displays downstream and upstream traffic counters for one or more CMs.                     |

# cable privacy

To enable and configure BPI or BPI+ encryption, use the **cable privacy** command in cable interface configuration mode. To disable privacy or to remove a particular configuration, use the **no** form of this command.

**cable privacy** [**accept-self-signed-certificate** | **authenticate-modem** | **authorize-multicast** | **mandatory** | **oaep-support** | **dsx-support** | **retain-failed-certificates** | **skip-validity-period**]

**no cable privacy** [**accept-self-signed-certificate** | **authenticate-modem** | **authorize-multicast** | **mandatory** | **oaep-support** | **dsx-support** | **retain-failed-certificates** | **skip-validity-period**]

## Syntax Description

|                                       |                                                                                                                                                                                                                                                                             |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>accept-self-signed-certificate</b> | (Optional) Allows cable modems to register using self-signed manufacturer certificates, as opposed to a manufacturer certificate that is chained to the DOCSIS root certificate.                                                                                            |
| <b>authenticate-modem</b>             | (Optional) Uses AAA protocols in conjunction with BPI to authenticate all CMs.                                                                                                                                                                                              |
| <b>authorize-multicast</b>            | (Optional) Uses AAA protocols with baseline privacy interface (BPI) to authorize all multicast stream (IGMP) join requests.                                                                                                                                                 |
| <b>mandatory</b>                      | (Optional) Requires baseline privacy be active for all CMs with BPI/BPI+ enabled in their DOCSIS configuration files or the CMs are forced to go offline.<br><br>If a CM does not have BPI enabled in its DOCSIS configuration file, it will be allowed online without BPI. |
| <b>oaep-support</b>                   | (Optional) Enables Optimal Asymmetric Encryption Padding (OAEP) BPI+ encryption.                                                                                                                                                                                            |
| <b>dsx-support</b>                    | (Optional) Enables encryption for dynamic services SIDs.                                                                                                                                                                                                                    |
| <b>retain-failed-certificates</b>     | (Optional) Allows to retain failed certificates.                                                                                                                                                                                                                            |
| <b>skip-validity-period</b>           | (Optional) Enables to skip certificate validity period.                                                                                                                                                                                                                     |

## Command Default

The encryption priority defaults to 128bit AES, 56bit DES, 40bit DES depending on modem capability. The CMTS treats self-signed manufacturer certificates as untrusted. Untrusted certificates are not retained by the CMTS.

## Command Modes

Interface configuration (config-if)

## Command History

| Release                                 | Modification                                                                                                             |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 12.1 T                                  | This command was introduced.                                                                                             |
| 12.1(4)CX,<br>12.2(1)XF1,<br>12.2(4)BC1 | Added the <b>dsx-support</b> and <b>oaep-support</b> keywords as part of support for BPI+ encryption.                    |
| 12.2(11)BC1                             | Changed the <b>accept-self-signed-certificate</b> option from a global configuration option to a cable interface option. |

| Release     | Modification                                                                                                                                            |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                         |
| 12.2(33)SCC | This command was modified. Added the <b>retain-failed-certificates</b> and <b>skip-validity-period</b> keywords. Removed the <b>40-bit-des</b> keyword. |

**Usage Guidelines**

This command is applicable only on images that support BPI or BPI+ encryption.

**Note**

The **cable privacy accept-self-signed-certificate** command affects only those CMs that register after you give the command. For example, if you give the **no cable privacy accept-self-signed-certificate** command so that CMs cannot register using self-signed certificates, you must then issue the **clear cable modem all reset** command to force all CMs reregister using certificates that are chained to the DOCSIS root certificate.

**Providing Self-Signed Certificates**

Cisco IOS Release 12.2(33)SCC and later releases allow self-signed CA certificates to be programmed on the file system to allow specific modems to authenticate. This is frequently used for test equipment and modems that are not DOCSIS compliant.

To provide self-signed CA certificates, perform the following steps:

1. Acquire the CA certificate in Distinguished Encoding Rules (DER) format. This can be supplied by the manufacturer or retrieved from the cable modem.
2. Store the self-signed CA certificate in the bootflash by naming it “trusted-cert-scrt *n*”, for example “trusted-cert-scrt1” or “trusted-cert-scrt2”.
3. Ensure that **cable privacy accept-self-signed-certificate** command is not enabled.
4. Save the configuration.
5. Reboot the router.

The router reads the new files and the self-signed cable modem comes online.

**Examples**

The following example shows how to force baseline privacy interface (BPI) to be used for all CMs on a particular cable interface:

```
Router(config)# interface cable 3/1
Router(config-if)# cable privacy mandatory
```

The following example shows how to turn on the BPI modem authentication for an interface:

```
Router(config)# interface cable 5/1/1
Router(config-if)# cable privacy authenticate-modem
```

The following example shows how to turn on BPI multicast authorization on a particular cable interface:

```
Router(config)# interface cable 1/0
Router(config-if) cable privacy authorize-multicast
```

The following example shows how to allow CMs to register with self-signed certificates on a particular cable interface:

```
Router(config)# interface cable 7/1/0
Router(config-if) cable privacy accept-self-signed-certificate
```

The following example shows how to allow CMs to enable privacy DSX support on a particular cable interface:

```
Router(config)# interface cable 3/1
Router(config-if) cable privacy dsx-support
```

The following example shows how to allow CMs to enable OAEP support on a particular cable interface:

```
Router(config)# interface cable 3/1
Router(config-if) cable privacy oaep-support
```

The following example shows how to allow CMs to retain failed certificates on a particular cable interface:

```
Router(config)# interface cable 3/1
Router(config-if) cable privacy retain-failed-certificates
```

The following example shows how to allow CMs to skip certificate validity period on a particular cable interface:

```
Router(config)# interface cable 3/1
Router(config-if) cable privacy skip-vailidity-period
```

#### Related Commands

| Command                              | Description                                                                   |
|--------------------------------------|-------------------------------------------------------------------------------|
| <b>cable privacy add-certificate</b> | Adds CM certificates for BPI+ encryption.                                     |
| <b>cable privacy eae-policy</b>      | Selects Early Authentication and Encryption policy.                           |
| <b>cable privacy hotlist</b>         | Adds a CM certificate to the DOCSIS hotlist so that it is no longer accepted. |
| <b>cable privacy kek</b>             | Sets key encryption keys and timeout periods.                                 |
| <b>cable privacy tek</b>             | Sets traffic encryption keys and timeout periods.                             |
| <b>show cable privacy</b>            | Displays information about BPI status and operation.                          |
| <b>debug cable privacy</b>           | Displays debug messages for BPI operation.                                    |

# cable privacy bpi-plus-enforce



Note

Effective with Cisco IOS Release 12.2(33)SCD5, the **cable privacy bpi-plus-enforce** command is replaced with the **cable privacy bpi-plus-policy** command. For more information, see the **cable privacy bpi-plus-policy** command.

To mandate that a cable modem provisioned in DOCSIS 1.1 or higher must register with DOCSIS Baseline Privacy Interface Plus (BPI+), and not use the earlier DOCSIS BPI, use the **cable privacy bpi-plus-enforce** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cable privacy bpi-plus-enforce**  
**no cable privacy bpi-plus-enforce**

Syntax Description

This command has no arguments or keywords.

Command Default

The **cable privacy bpi-plus-enforce** command is not enabled by default, but must be configured for optimal DOCSIS BPI+ security.

Command Modes

Global configuration (config)

Command History

| Release      | Modification                                                                     |
|--------------|----------------------------------------------------------------------------------|
| 12.3(21)BC   | This command was introduced.                                                     |
| 12.2(33)SCD5 | This command was replaced with the <b>cable privacy bpi-plus-policy</b> command. |

Usage Guidelines

The **cable privacy bpi-plus-enforce** command enables the Cisco CMTS router to detect cloned cable modems and eliminate denial-of-service (DOS) attacks that are caused by cloned cable modems.

If the cable modem is not provisioned to use DOCSIS BPI or BPI+ security certificates, then the existing behavior of the Cisco CMTS router remains unchanged. The Cisco CMTS router does not attempt to distinguish between two cable modems if neither is provisioned for BPI+ security.



Note

The non-DOCSIS compliant cable modems that are commonly available contain an option to force registration in DOCSIS BPI, as opposed to DOCSIS BPI+ mode, even in DOCSIS 1.1-provisioned networks.

Examples

The following example illustrates logging messages that are created with the detection of cloned cable modems:

```
SLOT 7/0: Nov 14 12:07:26: %UBR10000-6-CMMOVED: Cable modem 0007.0e03.3e71 has been moved
from interface Cable7/0/1 to interface Cable7/0/0.
```



```
Nov 14 12:07:57: %UBR10000-5-CLONED_CM_DETECTED: Cloned CM with MAC address 0013.7116.e726
access detected at Cable7/0/0 interface
```

**Related Commands**

| Command                              | Description                                                                                                                                                           |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable logging layer2events</b>    | Saves selected (low priority) DOCSIS events that are specified in the Cisco CMTS MIB registry to the cable logging buffer (instead of to the general logging buffer). |
| <b>cable privacy bpi-plus-policy</b> | Configures the BPI+ enforcement policies on a Cisco CMTS router.                                                                                                      |
| <b>show cable logging</b>            | Displays the log of messages about bad IP source addresses or DOCSIS layer events on the cable interfaces.                                                            |
| <b>show cable modem</b>              | Displays information for registered and non-registered cable modems on the Cisco CMTS.                                                                                |

# cable privacy bpi-plus-exclude

To exclude cable modems from the Baseline Privacy Interface Plus (BPI+) enforcement policies configured on a Cisco CMTS router, use the **cable privacy bpi-plus-exclude** command in global configuration mode. To disable this configuration, use the **no** form of this command.

**cable privacy bpi-plus-exclude** *mac-address* [*address-mask*]

**no cable privacy bpi-plus-exclude** *mac-address* [*address-mask*]

|                    |                     |                                |
|--------------------|---------------------|--------------------------------|
| Syntax Description | <i>mac-address</i>  | Cable modem MAC address.       |
|                    | <i>address-mask</i> | (Optional) Cable modem subnet. |

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.2(33)SCD5 | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | You can exclude individual cable modems, which are compliant with DOCSIS 1.0 and later versions, from the BPI+ enforcement policy based on their MAC addresses on a per-MAC domain basis. If a cable modem is added to the exclusion list, the Cisco CMTS router does not enforce the BPI+ enforcement policy on that cable modem. You can exclude a maximum of 30 cable modems per MAC domain. |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                     |
|----------|---------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows how to exclude a cable modem from the BPI+ enforcement policy based on its MAC address: |
|----------|---------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# cable privacy bpi-plus-exclude 0010.9571.03ab
```

| Related Commands | Command                              | Description                                                    |
|------------------|--------------------------------------|----------------------------------------------------------------|
|                  | <b>cable privacy bpi-plus-policy</b> | Configures the BPI+ enforcement policy on a Cisco CMTS router. |
|                  | <b>show interface cable privacy</b>  | Displays baseline privacy information.                         |

# cable privacy bpi-plus-policy

To configure the Baseline Privacy Interface Plus (BPI+) enforcement policies on a Cisco CMTS router, use the **cable privacy bpi-plus-policy** command in cable interface configuration mode. To disable this configuration, use the **no** form of this command.

```
cable privacy bpi-plus-policy {capable-enforcement | d11-enabled-enforcement |
d11-enforcement | total-enforcement}
```

```
no privacy bpi-plus-policy {capable-enforcement | d11-enabled-enforcement |
d11-enforcement | total-enforcement}
```

## Syntax Description

|                                |                                                                                                                                                                                                  |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>capable-enforcement</b>     | Specifies that BPI+ enforcement is required on all BPI+ capable cable modems that are BPI+ enabled and provisioned with DOCSIS1.1 configuration file (Policy 1).                                 |
| <b>d11-enabled-enforcement</b> | Specifies that BPI+ enforcement is required on all cable modems that register with a DOCSIS 1.1 configuration file with parameters indicating BPI+ is enabled with or without TLV 29 (Policy 2). |
| <b>d11-enforcement</b>         | Specifies that BPI+ enforcement is required on all cable modems that are compliant with DOCSIS 1.1 and later versions (Policy 3).                                                                |
| <b>total-enforcement</b>       | Specifies that BPI+ enforcement is required on all cable modems (Policy 4).                                                                                                                      |

## Command Default

None

## Command Modes

Interface configuration (config-if)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCD5 | This command was introduced. |

## Usage Guidelines

The **cable privacy bpi-plus-policy** command replaced the **cable privacy bpi-plus-enforce** command in Cisco IOS Release 12.2(33)SCD5. If you upgrade from an earlier Cisco IOS Release to Cisco IOS Release 12.2(33)SCD5 and later, the existing BPI+ enforcement configuration is disabled by default during the upgrade. You must reconfigure the BPI+ enforcement policy using the **cable privacy bpi-plus-policy** command.

You can configure only one enforcement policy at a time per MAC domain. If you configure one policy after another, the latest policy supersedes the already existing policy. For example, if you want Policy 2 to take over Policy 1, you can directly configure the former without disabling the latter.

## Examples

The following example shows how to configure BPI+ enforcement policies on the cable interface 3/0 on the Cisco uBR7246VXR router:

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable privacy bpi-plus-policy capable-enforcement
Router(config-if)# cable privacy bpi-plus-policy d11-enabled-enforcement
Router(config-if)# cable privacy bpi-plus-policy d11-enforcement
Router(config-if)# cable privacy bpi-plus-policy total-enforcement
```

## Related Commands

| Command                               | Description                                                                                   |
|---------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>cable privacy bpi-plus-exclude</b> | Excludes individual cable modems from BPI+ enforcement policies based on their MAC addresses. |
| <b>show interface cable privacy</b>   | Displays baseline privacy information.                                                        |

# cable privacy clone-detect

To enable the clone modem functionality for a cable modem, use the **cable privacy clone-detect** command in global configuration mode. To disable clone modem functionality, use the **no** form of this command.

**cable privacy clone-detect**

**no cable privacy clone-detect**

## Syntax Description

This command has no keywords or arguments.

## Command Default

The clone modem functionality is enabled.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

Use this command to enable or disable the clone modem functionality.

## Examples

The following example shows how to enable the clone modem functionality, so that the cloned cable modems cannot register with the CMTS:

```
Router# configure terminal
Router(config)# cable privacy clone-detect
```

## Related Commands

| Command                                    | Description                                                                                                                                                    |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable privacy</b>                       | Enables and configures BPI+ encryption on a cable interface.                                                                                                   |
| <b>cable privacy bpi-plus-enforce</b>      | Specifies that a cable modem provisioned in DOCSIS 1.1 or higher must register with DOCSIS BPI+, and not use the earlier DOCSIS BPI.                           |
| <b>cable logging layer2events</b>          | Saves selected (low priority) DOCSIS events that are specified in the Cisco CMTS MIB registry to the cable logging buffer (not of the general logging buffer). |
| <b>show cable logging</b>                  | Displays the log of messages, about bad IP source addresses or DOCSIS-layer events, on the cable interfaces.                                                   |
| <b>show cable modem</b>                    | Displays information for registered and non-registered cable modems on the Cisco CMTS.                                                                         |
| <b>show running-config interface cable</b> | Displays the bundles that are configured on a Cisco CMTS router showing the running configuration for each of the cable interfaces.                            |

# cable privacy eae-exclude

To force a cable modem to register without an Early Authentication and Encryption (EAE) and add it to the EAE exclusion list, use the **cable privacy eae-exclude** command in global configuration mode. To remove a particular CM from the exclusion list, use the **no** form of this command.

**cable privacy eae-exclude** *cm-mac-address* [*mask*]

**no cable privacy eae-exclude** *cm-mac-address* [*mask*]

## Syntax Description

|                       |                                                                                         |
|-----------------------|-----------------------------------------------------------------------------------------|
| <i>cm-mac-address</i> | Hardware (MAC) address of a specific cable modem to be added to the EAE exclusion list. |
| <i>mask</i>           | (Optional) Mask value for the cable modem.                                              |

## Command Default

The EAE exclusion list does not contain any MAC address.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

The exclusion list is mainly used to debug issues with specific cable modems.

## Examples

The following example shows how to add a CM with the MAC address of 00C0.8345.de51 to the EAE exclusion list, so that this particular CM cannot register with the CMTS:

```
Router# configure terminal
Router(config)# cable privacy eae-exclude 00C0.8345.de51
Router(config)#
```

## Related Commands

| Command                   | Description                                                  |
|---------------------------|--------------------------------------------------------------|
| <b>cable privacy</b>      | Enables and configures BPI+ encryption on a cable interface. |
| <b>cable privacy kek</b>  | Sets key encryption keys and timeout periods.                |
| <b>cable privacy tek</b>  | Sets traffic encryption keys and timeout periods.            |
| <b>show cable privacy</b> | Displays information about BPI status and operation.         |

# cable privacy eae-policy

To enable the Early Authentication and Encryption (EAE) policy, use the **cable privacy eae-policy** command in cable interface configuration mode. To disable the EAE policy, use the **no** form of this command.

**cable privacy eae-policy** { **capability-enforcement** | **disable-enforcement** | **ranging-enforcement** | **total-enforcement** }

**no cable privacy eae-policy** { **capability-enforcement** | **disable-enforcement** | **ranging-enforcement** | **total-enforcement** }

|                           |                               |                                                                                 |
|---------------------------|-------------------------------|---------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>capability-enforcement</b> | Enforces EAE on capable modems.                                                 |
|                           | <b>disable-enforcement</b>    | Disables EAE thereby preventing the CMTS from enforcing EAE on any cable modem. |
|                           | <b>ranging-enforcement</b>    | Enforces EAE only on DOCSIS 3.0 modems.                                         |
|                           | <b>total-enforcement</b>      | Enforces EAE on all cable modems.                                               |

**Command Default** EAE policy is disabled.

**Command Modes** Interface configuration (config-if)

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCC    | This command was introduced. |

**Usage Guidelines** The EAE policy is applied on a MAC domain and the policies are mutually exclusive. The CMTS enforces EAE only on CMs that initialize on a downstream channel on which the CMTS is transmitting MAC Domain Descriptor (MDD) messages.

The EAE exclusion list is a global list and is created on all line cards as part of the DOCSIS 3.0 specifications. Cable modems in the EAE exclusion list are always exempted from EAE enforcement. If the CMTS receives an authorization request before the CM is registered in the EAE exclusion list, the CMTS rejects that request.

**Examples** The following example shows how to enforce EAE policy on capable modems:

```
Router(config)# interface cable 3/1
Router(config-if)# cable privacy eae-policy capability-enforcement
```

The following example shows how to disable EAE policy so that the CMTS does not enforce EAE policy on any cable modem:

```
Router(config)# interface cable 3/1
Router(config-if)# cable privacy eae-policy disable-enforcement
```

The following example shows how to enforce EAE policy on DOCSIS 3.0 modems only:

```
Router(config)# interface cable 3/1
Router(config-if) cable privacy eae-policy ranging-enforcement
```

The following example shows how to enforce EAE policy on all cable modems:

```
Router(config)# interface cable 3/1
Router(config-if) cable privacy eae-policy total-enforcement
```

#### Related Commands

| Command                      | Description                                                                   |
|------------------------------|-------------------------------------------------------------------------------|
| <b>cable privacy hotlist</b> | Adds a CM certificate to the DOCSIS hotlist so that it is no longer accepted. |
| <b>cable privacy kek</b>     | Sets Key Encryption Keys and timeout periods.                                 |
| <b>cable privacy tek</b>     | Sets Traffic Encryption Keys and timeout periods.                             |
| <b>show cable privacy</b>    | Displays information about BPI status and operation.                          |



# cable privacy encrypt-alg-priority

To specify the order in which to use the Advanced Encryption Standard (AES) and Data Encryption Standard (DES) encryption algorithm, use the **cable privacy encrypt-alg-priority** command in global configuration mode. To remove the encryption algorithm and revert to the default priority, use the **no** form of this command.

```
cable privacy encrypt-alg-priority {aes128-des40-des56 | aes128-des56-des40 |
des40-aes128-des56 | des40-des56-aes128 | des56-aes128-des40 | des56-des40-aes128}
```

```
no cable privacy encrypt-alg-priority
```

| Syntax Description        |                                                                                                                                                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>aes128-des40-des56</b> | Specifies the order of the encryption algorithm priority.<br>AES with a 128-bit block is given the highest priority, followed by DES with 40-bit block size, and DES with 56-bit block size.      |
| <b>aes128-des56-des40</b> | Specifies the order of the encryption algorithm priority.<br>AES with a 128-bit block size is given the highest priority, followed by DES with 56-bit block size, DES with 40-bit block size.     |
| <b>des40-aes128-des56</b> | Specifies the order of the encryption algorithm priority.<br>DES with 40-bit block size is given the highest priority, followed by AES with a 128-bit block size, and DES with 56-bit block size. |
| <b>des40-des56-aes128</b> | Specifies the order of the encryption algorithm priority.<br>DES with 40-bit block size is given the highest priority, followed by DES with 56-bit block size and AES with 128-bit block size.    |
| <b>des56-aes128-des40</b> | Specifies the order of the encryption algorithm priority.<br>DES with 56-bit block size is given the highest priority, followed by AES with a 128-bit block size, and DES with 40-bit block size. |
| <b>des56-des40-aes128</b> | Specifies the order of the encryption algorithm priority.<br>DES with 56-bit block size is given the highest priority, followed by DES with 40-bit block size, and AES with a 128-bit block size. |

|                        |                                      |
|------------------------|--------------------------------------|
| <b>Command Default</b> | Default value is aes128-des56-des40. |
|------------------------|--------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

|                         |                                                                             |
|-------------------------|-----------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Use this command to specify the order of the encryption algorithm priority. |
|-------------------------|-----------------------------------------------------------------------------|

## Examples

The following example shows how to assign AES the highest priority, followed by 40-bit DES, and 56-bit DES.

```
Router# configure terminal
Router(config)# cable privacy encrypt-alg-priority aes128-des40-des56
Router(config)#
```

## Related Commands

| Command                   | Description                                                  |
|---------------------------|--------------------------------------------------------------|
| <b>cable privacy</b>      | Enables and configures BPI+ encryption on a cable interface. |
| <b>cable privacy kek</b>  | Sets Key Encryption Keys and timeout periods.                |
| <b>cable privacy tek</b>  | Sets Traffic Encryption Keys and timeout periods.            |
| <b>show cable privacy</b> | Displays information about BPI status and operation.         |

# cable privacy hotlist

To mark a manufacturer's or CM certificate as untrusted and add them to the CMTS hotlist of invalid certificates, thereby preventing those CMs from registering, use the **cable privacy hotlist** command in global configuration mode. To remove a particular CM or manufacturer's certificate from the hotlist, use the **no** form of this command.

**cable privacy hotlist** {**cm** *mac-address* | **manufacturer** *cert-serial-number*}

**no cable privacy hotlist** {**cm** *mac-address* | **manufacturer** *cert-serial-number*}

|                    |                                               |                                                                                                                                                                                                                                                                                                                   |
|--------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>cm</b> <i>mac-address</i>                  | Specifies the MAC address for the CM to be added to the hotlist. The <i>mac-address</i> should be specified as a hexadecimal string, without periods or other separators. In Cisco IOS Release 12.2(15)BC2 and later releases, you can also specify it as three sets of hexadecimal digits, separated by periods. |
|                    | <b>manufacturer</b> <i>cert-serial-number</i> | Specifies the serial number for the particular manufacturer CA certificate. The <i>cert-serial-number</i> should be specified as a hexadecimal string up to 32 bytes in length. Enter multiple lines as needed, and use a blank line to terminate the string.                                                     |

|                 |                                                     |
|-----------------|-----------------------------------------------------|
| Command Default | The CMTS hotlist does not contain any certificates. |
|-----------------|-----------------------------------------------------|

|               |                      |
|---------------|----------------------|
| Command Modes | Global configuration |
|---------------|----------------------|

| Command History | Release                                 | Modification                                                                                                                                     |
|-----------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(7)CX,<br>12.2(1)XF1,<br>12.2(4)BC1 | This command was introduced for the Cisco uBR7100 series and Cisco uBR7200 series routers.                                                       |
|                 | 12.2(11)BC1                             | The <b>accept-self-signed-certificate</b> option was moved to the <b>cable privacy</b> cable interface command.                                  |
|                 | 12.2(15)BC2                             | The mac-address can be specified in the canonical form of three pairs of hexadecimal digits, separated by periods (for example, 0000.0001.0002). |
|                 | 12.2(33)SCB5                            | This command was integrated into the 12.2SC release train.                                                                                       |

|                  |                                                                                |
|------------------|--------------------------------------------------------------------------------|
| Usage Guidelines | This command is applicable only on images that support BPI or BPI+ encryption. |
|------------------|--------------------------------------------------------------------------------|

**Note**

The **cable privacy hotlist** command is not supported on the Cisco uBR10012 router running Cisco IOS releases prior to Cisco IOS release 12.3(23)BC9, Cisco IOS release 12.2(33)SCB5, and Cisco IOS release 12.2(33)SCC. To add a manufacturer's or CM certificate to the hotlist on the Cisco uBR10012 router, use SNMP commands to set the appropriate attributes in [DOCS-BPI-PLUS-MIB](#). For more information, see the [DOCSIS 1.1 for the Cisco CMTS Routers](#).

**Examples**

The following command adds the CM certificate with the MAC address of 00C0.8345.de51 to the hotlist, so that this particular CM cannot register with the CMTS:

```
Router# config t
Router(config)# cable privacy hotlist cm 00C08345de51

Router(config)#
```

The following example adds a manufacturer CA certificate into the BPI+ hotlist, so that the CMTS will reject any CM attempting to register with a certificate from that particular manufacturer:

```
Router# config t
Router(config)# cable privacy hotlist manufacturer
3435414631413439383335453731423733333643
```

**Associated Features**

The **cable privacy hotlist** command is used to configure the following features:

- [DOCSIS 1.1 for the Cisco CMTS Routers](#)

**Related Commands**

| Command                              | Description                                                  |
|--------------------------------------|--------------------------------------------------------------|
| <b>cable privacy</b>                 | Enables and configures BPI+ encryption on a cable interface. |
| <b>cable privacy add-certificate</b> | Adds CM certificates for BPI+ encryption.                    |
| <b>option</b>                        | Determines whether a specific CM is online.                  |
| <b>cable privacy kek</b>             | Sets key encryption keys and timeout periods.                |
| <b>cable privacy tek</b>             | Sets traffic encryption keys and timeout periods.            |
| <b>show cable privacy</b>            | Displays information about BPI status and operation.         |
| <b>debug cable privacy</b>           | Displays debug messages for BPI operation.                   |

# cable privacy kek

To set key encryption keys (KEKs) life-time values for baseline privacy on an HFC network, use the **cable privacy kek** command in cable interface configuration mode. To restore the default values, use the **no** form of this command.

**cable privacy kek life-time** [*seconds*]

**no cable privacy kek life-time**

**Note**

This command is applicable only on images that support BPI or BPI+ encryption.

**Syntax Description**

|                                 |                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>life-time</b> <i>seconds</i> | (Optional) Length of the key encryption life-time in seconds. Valid range is 300 to 604,8000. The default is 604,800 seconds (7 days). |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|

**Command Default**

The **life-time** option to 604,800 seconds (7 days).

**Command Modes**

Interface configuration only (config-if)

**Command History**

| Release                                 | Modification                                                                            |
|-----------------------------------------|-----------------------------------------------------------------------------------------|
| 11.3 XA                                 | This command was introduced.                                                            |
| 12.1(4)CX,<br>12.2(1)XF1,<br>12.2(4)BC1 | The valid range for both options was changed to support DOCSIS 1.1 and BPI+ encryption. |

**Usage Guidelines**

Baseline privacy on an HFC network is configured with key encryption keys (KEKs) and traffic encryption keys (TEKs). The encryption is based on 40-bit or 56-bit data encryption standard (DES) encryption algorithms.

A KEK is assigned to a CM based on the CM service identifier (SID) and permits the CM to connect to the Cisco CMTS when baseline privacy is activated. KEKs can be set to expire based a life-time value.

The **life-time** keyword is used to assign a more permanent key to a CM.

A CM that has a life-time key assigned by the Cisco CMTS requests a new key before the current one expires.

**Examples**

The following example shows how to set the KEK privacy life-time to 750,000 seconds:

```
Router(config)# interface cable c3/0
Router(config-if)# cable privacy kek life-time 750000
Router(config-if)#
```

| Related Commands | Command                              | Description                                                                         |
|------------------|--------------------------------------|-------------------------------------------------------------------------------------|
|                  | <b>cable privacy add-certificate</b> | Configures certificates for BPI+ encryption.                                        |
|                  | <b>cable privacy</b>                 | Enables and configures BPI+ encryption on a cable interface.                        |
|                  | <b>cable privacy tek</b>             | Sets traffic encryption keys and timeout periods.                                   |
|                  | <b>option</b>                        | Determines whether a specific CM is online.                                         |
|                  | <b>privacy</b>                       | Configures the BPI or BPI+ configuration parameters in a DOCSIS configuration file. |
|                  | <b>show cable privacy</b>            | Displays information about BPI status and operation.                                |
|                  | <b>show interface cable privacy</b>  | Displays the current values of the KEK and TEK timers for an interface.             |
|                  | <b>debug cable privacy</b>           | Displays debug messages for BPI operation.                                          |

# cable privacy revocation crl skip-sig-check

To allow the Cisco CMTS router to skip the certification revocation list (CRL) response signature check, use the **cable privacy revocation crl skip-sig-check** command in global configuration mode. To enable CRL signature check, use the **no** form of this command.

**cable privacy revocation crl skip-sig-check**

**no cable privacy revocation crl skip-sig-check**

## Syntax Description

This command has no keywords or arguments.

## Command Default

The CRL response signature check is enabled by default.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

The **cable privacy revocation crl skip-sig-check** command allows you to use the CRL response from the CRL server without validating the signature of the response.

## Examples

The following example shows how to skip the CRL response signature check:

```
Router(config)# cable privacy revocation crl skip-sig-check
```

## Related Commands

| Command                                             | Description                                           |
|-----------------------------------------------------|-------------------------------------------------------|
| <b>cable privacy revocation oosp skip-sig-check</b> | Allows to skip the OCSP response signature check.     |
| <b>cable privacy revocation skip-cm-cert</b>        | Allows to disable checking of the CM certificates.    |
| <b>cable privacy revocation timeout</b>             | Sets the timeout value of CRL or OCSP response time.  |
| <b>cable privacy revocation enable</b>              | Allows to quickly enable privacy revocation checking. |
| <b>show cable privacy</b>                           | Displays information about BPI status and operation.  |
| <b>debug cable privacy</b>                          | Displays debug messages for BPI operation.            |

# cable privacy revocation enable

To quickly enable privacy revocation checking, use the **cable privacy revocation enable** command in global configuration mode. To disable privacy revocation checking, use the **no** form of this command.

- cable privacy revocation enable**
- no cable privacy revocation enable**

**Syntax Description** This command has no keywords or arguments.

**Command Default** The privacy revocation checking is disabled by default.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

**Usage Guidelines** This command allows you to quickly enable or disable revocation checking. When you enable revocation checking, it creates the trustpoints for both the EU and US certificates.

**Examples** The following example shows how to enable revocation checking:

```
Router(config)# cable privacy revocation enable
```

| Related Commands | Command                                              | Description                                          |
|------------------|------------------------------------------------------|------------------------------------------------------|
|                  | <b>cable privacy revocation ocsig skip-sig-check</b> | Allows to skip the OCSP response signature check.    |
|                  | <b>cable privacy revocation skip-cm-cert</b>         | Allows to disable checking of the CM certificates.   |
|                  | <b>cable privacy revocation timeout</b>              | Sets the timeout value of CRL or OCSP response time. |
|                  | <b>show cable privacy</b>                            | Displays information about BPI status and operation. |
|                  | <b>debug cable privacy</b>                           | Displays debug messages for BPI operation.           |



# cable privacy revocation ocsip skip-sig-check

To allow the Cisco CMTS router to skip the Online Certificate Status Protocol (OCSP) response signature check, use the **cable privacy revocation ocsip skip-sig-check** command in global configuration mode. To enable OCSP signature check, use the **no** form of this command.

**cable privacy revocation ocsip skip-sig-check**

**no cable privacy revocation ocsip skip-sig-check**

## Syntax Description

This command has no keywords or arguments.

## Command Default

OCSP response signature check is enabled by default.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

The **cable privacy revocation ocsip skip-sig-check** command allows you to use the OCSP response from the OCSP responder without validating the signature of the response.

## Examples

The following example shows how to skip the OCSP response signature check:

```
Router(config)# cable privacy revocation ocsip skip-sig-check
```

## Related Commands

| Command                                      | Description                                           |
|----------------------------------------------|-------------------------------------------------------|
| <b>cable privacy revocation enable</b>       | Allows to quickly enable privacy revocation checking. |
| <b>cable privacy revocation skip-cm-cert</b> | Allows to disable checking of the CM certificates.    |
| <b>cable privacy revocation timeout</b>      | Sets the timeout value of CRL or OCSP response time.  |
| <b>show cable privacy</b>                    | Displays information about BPI status and operation.  |
| <b>debug cable privacy</b>                   | Displays debug messages for BPI operation.            |

# cable privacy revocation skip-cm-cert

To disable checking of the CM certificates, use the **cable privacy revocation skip-cm-cert** command in global configuration mode. To enable checking of CM certificates, use the **no** form of this command.

**cable privacy revocation skip-cm-cert**

**no cable privacy revocation skip-cm-cert**

**Syntax Description** This command has no keywords or arguments.

**Command Default** CM certificate checking is enabled by default.

**Command Modes** Global configuration (config)

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

**Usage Guidelines** The **cable privacy revocation skip-cm-cert** command allows you to disable checking of CM certificates.



**Note**

Checking CM certificates requires a lot of processing power, which impacts the router performance.

**Examples** The following example shows how to disable checking of CM certificates:

```
Router(config)# cable privacy revocation skip-cm-cert
```

| Command                                              | Description                                           |
|------------------------------------------------------|-------------------------------------------------------|
| <b>cable privacy revocation enable</b>               | Allows to quickly enable privacy revocation checking. |
| <b>cable privacy revocation ocsdp skip-sig-check</b> | Allows to skip the OCSP response signature check.     |
| <b>cable privacy revocation timeout</b>              | Sets the timeout value of CRL or OCSP response time.  |
| <b>show cable privacy</b>                            | Displays information about BPI status and operation.  |
| <b>debug cable privacy</b>                           | Displays debug messages for BPI operation.            |

# cable privacy tek

To set traffic encryption keys (TEKs) life-time values for baseline privacy on an HFC network, use the **cable privacy tek** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable privacy tek life-time** [*seconds*]

**no cable privacy tek life-time**

**Note**

This command is applicable only on images that support BPI or BPI+ encryption.

**Syntax Description**

|                                 |                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>life-time</b> <i>seconds</i> | (Optional) Length of the traffic encryption life-time in seconds. Valid range is 180 to 604,8000. Default is 43,200 seconds (12 hours). |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|

**Command Default**

The **life-time** option to 43200 seconds (12 hours).

**Command Modes**

Interface configuration only (config-if)

**Command History**

| Release                                 | Modification                                                                            |
|-----------------------------------------|-----------------------------------------------------------------------------------------|
| 11.3 XA                                 | This command was introduced.                                                            |
| 12.1(4)CX,<br>12.2(1)XF1,<br>12.2(4)BC1 | The valid range for both options was changed to support DOCSIS 1.1 and BPI+ encryption. |

**Usage Guidelines**

Baseline privacy on an HFC network is configured with key encryption keys (KEKs) and traffic encryption keys (TEKs). The encryption is based on 40-bit or 56-bit data encryption standard (DES) encryption algorithms.

The TEK is assigned to a CM when its KEK has been established. The TEK is used to encrypt data traffic between the CM and the Cisco CMTS. TEKs can be set to expire based a life-time value.

The **life-time** keyword is used to assign a more permanent key to a CM.

A CM that has a life-time key assigned by the Cisco CMTS requests a new key before the current one expires.

**Examples**

The following example shows how to set the traffic encryption key life-time to 800000 seconds:

```
Router(config)# interface cable c3/0
Router(config-if)# cable privacy tek life-time 800000
Router(config-if)#
```

| Related Commands | Command                              | Description                                                                         |
|------------------|--------------------------------------|-------------------------------------------------------------------------------------|
|                  | <b>cable privacy add-certificate</b> | Configures certificates for BPI+ encryption.                                        |
|                  | <b>cable privacy</b>                 | Enables and configures BPI+ encryption on a cable interface.                        |
|                  | <b>cable privacy kek</b>             | Sets key encryption keys and timeout periods.                                       |
|                  | <b>option</b>                        | Determines whether a specific CM is online.                                         |
|                  | <b>privacy</b>                       | Configures the BPI or BPI+ configuration parameters in a DOCSIS configuration file. |
|                  | <b>show cable privacy</b>            | Displays information about BPI status and operation.                                |
|                  | <b>show interface cable privacy</b>  | Displays the current values of the KEK and TEK timers for an interface.             |
|                  | <b>debug cable privacy</b>           | Displays debug messages for BPI operation.                                          |

# cable privacy revocation timeout

To set the timeout value of certification revocation list (CRL) or Online Certificate Status Protocol (OCSP) response time for authorization “reply” or “reject” messages, use the **cable privacy revocation timeout** command in global configuration mode. To return to the default timeout value, use the **no** form of this command.

**cable privacy revocation timeout**

**no cable privacy revocation timeout**

**Syntax Description** This command has no keywords or arguments.

**Command Default** Default timeout value is 1 second.

**Command Modes** Global configuration (config)

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

**Usage Guidelines** This command only takes effect if **cable privacy revocation enable** command is configured. The timeout value for authorization “reply” or “reject” messages in the CM configuration file must be greater than the revocation timeout value.

**Examples** The following example shows how to set the timeout value for CRL or OCSP response:

```
Router(config)# cable privacy revocation timeout 15
```

| Command                                             | Description                                           |
|-----------------------------------------------------|-------------------------------------------------------|
| <b>cable privacy revocation enable</b>              | Allows to quickly enable privacy revocation checking. |
| <b>cable privacy revocation ocsp skip-sig-check</b> | Allows to skip the OCSP response signature check.     |
| <b>cable privacy revocation skip-cm-cert</b>        | Allows to disable checking of the CM certificates.    |
| <b>show cable privacy</b>                           | Displays information about BPI status and operation.  |
| <b>debug cable privacy</b>                          | Displays debug messages for BPI operation.            |

# cable proxy-arp

To activate cable proxy Address Resolution Protocol (ARP) on the cable interface or subinterface, use the **cable proxy-arp** command in cable interface or subinterface configuration mode. To disable this feature, use the **no** form of this command.

- cable proxy-arp**
- no cable proxy-arp**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Proxy APR service is enabled.

**Command Modes** Cable interface and subinterface configuration

| Command History | Release    | Modification                        |
|-----------------|------------|-------------------------------------|
|                 | 11.3 XA    | This command was introduced.        |
|                 | 12.1(3a)EC | The subinterface support was added. |
|                 |            |                                     |

**Usage Guidelines** This command enables or disables direct host-to-host communications over the same cable subnet. Because the downstream and upstream are separate interfaces, CMs cannot directly perform address resolution with other CMs on the cable plant. This means that the CMs must send all traffic through the CMTS, even if the destination CM is on the same subnet.

The **cable proxy-arp** command enables the Cisco CMTS to act as a proxy for ARP requests generated by the CMs, which allows CMs on the same cable subnet to communicate directly with each other, without the traffic having to be routed first through the CMTS. The **no cable proxy-arp** command disables this feature, preventing CMs on the same subnet from communicating with each other without routing the traffic through the CMTS.



**Note** Using the **no cable arp** and **no cable proxy-arp** commands shifts all responsibility for the management of the IP addresses used by CMs and CPE devices to the DHCP server and provisioning system.

**Examples** The following example shows how to activate proxy ARP for host-to-host communications:

```
Router(config-subif)# cable proxy-arp
```

The following example shows how to activate proxy ARP for host-to-host communications, on the cable subinterface:

```
Router(config)# interface cable 6/0.1
Router(config-subif)# cable proxy-arp
```

**Related Commands****Command Description****cable arp** Activates cable Address Resolution Protocol (ARP).

# cable qos enforce-rule

To create an enforce-rule to enforce a particular quality of service (QoS) profile for subscriber traffic management, and to enter enforce-rule configuration mode, use the **cable qos enforce-rule** command in global configuration mode. To delete an enforce-rule and to remove it from the CMTS configuration, use the **no** form of this command.

**cable qos enforce-rule** *rule-name*

**no cable qos enforce-rule** *rule-name*

## Syntax Description

*rule-name* Name of the enforce-rule to be created and configured. This name can be any arbitrary and unique string from 1 to 15 characters in length.

## Command Default

No enforce-rules are created.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                                  |
|-------------|-------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced.                                                                                                  |
| 12.3(9a)BC  | This command was integrated into Cisco IOS Release 12.3(9a)BC. This command replaces the <b>cable qos monitoring</b> command. |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.            |

## Usage Guidelines

The **cable qos enforce-rule** command creates an enforce-rule with the specified name and then enters enforce-rule configuration mode. After entering enforce-rule configuration mode, use the following commands to configure the enforce-rule:

- **activate-rule at-byte-count**
- **enabled (enforce-rule)**
- **enforced qos-profile**
- **monitoring-duration**
- **penalty-period**
- **registered qos-profile**

At the very minimum, you must use the **activate-rule at-byte-count** and **registered qos-profile** commands to configure an enforce-rule, and the **enabled** command to activate it, before it takes effect.



### Note

Effective with Cisco IOS Release 12.3(9a)BC, the **activate-rule at-byte-count** command is not available in Cisco IOS software.



### Maximum Number of Rules

The Cisco CMTS routers support a certain maximum number of enforce-rules depending on your Cisco IOS software release. If you have created the maximum number of enforce-rules and want to create another rule, you must first delete one of the existing rules.

- Cisco IOS Release 12.2(15)BC1 and later—Supports a maximum of 20 enforce-rules.
- Beginning in Cisco IOS Release 12.3(23)BC2—Supports a maximum of 40 enforce-rules.



#### Note

The maximum number of enforce-rules is counted as the total number of rules created on both the upstreams and downstreams combined.

### Examples

The following example shows the creation of an enforce-rule named “residential.” The system then enters the enforce-rule configuration mode.

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# ?

Configuration commands for QoS enforce rules:
 activate-rule Activate rule parameters
 enabled Enable the enforce-rule
 enforced Enforced qos-profile
 exit Exit from QoS enforce rule editing mode
 monitoring-duration Monitoring duration parameters
 no Negate a command or set its defaults
 penalty-period Penalty-period
 registered Registered qos-profile

Router(enforce-rule)# activate-rule at-byte-count 50000000 downstream enforced
Router(enforce-rule)# registered qos-profile 5
Router(enforce-rule)# enforced qos-profile 99
Router(enforce-rule)# monitoring-duration 120 sample-rate 20
Router(enforce-rule)# penalty-period 1440
Router(enforce-rule)# enabled
Router(enforce-rule)# exit
Router(config)# exit
```

The following example shows the deletion of an enforce-rule named “test”:

```
Router# configure terminal
Router(config)# no cable qos enforce-rule test
```

The following example shows the error message that is displayed if you try to create more than 20 enforce-rules in Cisco IOS Release 12.3(23)BC1 and earlier:

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
```

Can't create more enforce-rules. The maximum number is 20.

The following example shows the error message that is displayed when you try to name an enforce-rule with a name that is larger than 15 characters. An error message is displayed, and the name is truncated to the first 15 characters.

```
Router# configure terminal
Router(config)# cable qos enforce-rule reallyreallyreallylongname
```

Only the first 15 characters would be taken

| Related Commands | Command                                  | Description                                                                                                                            |
|------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>activate-rule at-byte-count</b>       | Specifies the number of bytes that a subscriber can transmit during the monitoring period.                                             |
|                  | <b>debug cable subscriber-monitoring</b> | Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.                                      |
|                  | <b>enabled (enforce-rule)</b>            | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.                                             |
|                  | <b>duration</b>                          | Specifies the time period and sample rate to be used for monitoring subscribers.                                                       |
|                  | <b>penalty-period</b>                    | Specifies the time period that an enforced QoS profile should be in effect for subscribers that violate their registered QoS profiles. |
|                  | <b>qos-profile enforced</b>              | Specifies a QoS profile that should be enforced when users violate their registered QoS profiles.                                      |
|                  | <b>qos-profile registered</b>            | Specifies the registered QoS profile that should be used for this enforce-rule.                                                        |
|                  | <b>show cable qos enforce-rule</b>       | Displays the QoS enforce-rules that are currently defined.                                                                             |
|                  | <b>show cable subscriber-usage</b>       | Displays subscribers who are violating their registered QoS profiles.                                                                  |

# cable qos permission

To specify permission for updating the quality of service (QoS) table, use the **cable qos permission** command in global configuration mode. To remove a previously enabled permission, use the **no** form of this command.

**cable qos permission** { **create** | **enforce** *index* | **modems** | **update** }

**no cable qos permission**

## Syntax Description

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>create</b>               | Permits creation of QoS table entries by Simple Network Management Protocol (SNMP).                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>enforce</b> <i>index</i> | The <b>enforce</b> keyword overrides the provisioned QoS profile of the CM and enforces a specific CMTS-local QoS profile. The <i>index</i> argument specifies the number of the QoS profile to be enforced on all CMs connecting to the CMTS. Valid values are from 1 to 1023.<br><br><b>Note</b> Both the originally provisioned QoS profile and the enforced QoS profile must be created on the Cisco CMTS. This option does not support profiles that are created by the CM. |
| <b>modems</b>               | Permits creation of QoS table entries by modem registration requests.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>update</b>               | Permits dynamic update of QoS table entries by SNMP.                                                                                                                                                                                                                                                                                                                                                                                                                             |

## Command Default

Enable by modem and SNMP

## Command Modes

Global configuration

## Command History

| Release   | Modification                                                                                                                 |
|-----------|------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA   | This command was introduced.                                                                                                 |
| 11.3(9)NA | The <b>enforce</b> keyword was added.                                                                                        |
| 12.1(4)CX | This command was deprecated for DOCSIS 1.1 use, because DOCSIS 1.1 replaces the QoS profile model with a service flow model. |

## Usage Guidelines

If the QoS profile to be enforced does not exist at the CMTS during registration, the CMTS uses the QoS profile configured for the registering CM.

If you disable the use of CM-created profiles, using the **no cable qos permission** command, any CMs using such a profile go offline immediately and the CM-created profiles are removed.

This **no cable qos permission** command is similar to the docsIfCmtsQosProfilePermissions attribute in the DOCS-IF-MIB, as both prohibit CMs from creating their own QoS profiles in the future. However, the **no cable qos permission** command also immediately deletes QoS profiles that have been created by the cable modems and takes those modems offline. The docsIfCmtsQosProfilePermissions method does not affect QoS profiles that are currently in use, but only unused profiles and profiles that are created in the future.

**Examples**

The following example shows how to enable CMs to request arbitrary QoS parameters:

```
Router(config)# cable qos permission modems
```

The following example shows how a CM with a QoS profile 4 created by the CM is reset to use QoS profile 225 enforced by the cable router (management):

```
CMTS01# show cable modem
```

| Interface   | SID | Online State | Timing Offset | Receive Power | QoS | IP address  | MAC address    |
|-------------|-----|--------------|---------------|---------------|-----|-------------|----------------|
| Cable6/0/U0 | 1   | online       | 2848          | 0.00          | 4   | 19.2.20.139 | 0010.7b6b.7215 |

```
CMTS01# show cable qos profile 4
```

| Service class | Prio | Max upstream bandwidth | Guarantee upstream bandwidth | Max downstream bandwidth | Max tx burst | TOS mask | TOS value | Create by | B priv enab |
|---------------|------|------------------------|------------------------------|--------------------------|--------------|----------|-----------|-----------|-------------|
| 4             | 7    | 128000                 | 64000                        | 2048000                  | 255          | 0x0      | 0x0       | cm        | no          |

```
CMTS01(config)# cable qos profile 225 max-upstream 256
```

```
CMTS01(config)# cable qos permission enforce 225
```

```
CMTS01# clear cable modem all reset
```

```
CMTS01# show cable modem
```

| Interface   | SID | Online State | Timing Offset | Receive Power | QoS | IP address  | MACaddress     |
|-------------|-----|--------------|---------------|---------------|-----|-------------|----------------|
| Cable6/0/U0 | 1   | offline      | 2848          | 0.25          | 2   | 19.2.20.139 | 0010.7b6b.7215 |

```
CMTS01# debug cable reg
```

```
....
00:15:59: Finished parsing REG Request
00:15:59: Overriding Provisioned QoS Parameters In REG-REQ
....
```

```
CMTS01# show cable modem
```

| Interface   | SID | Online State | Timing Offset | Receive Power | QoS | IP address  | MACaddress     |
|-------------|-----|--------------|---------------|---------------|-----|-------------|----------------|
| Cable6/0/U0 | 1   | online       | 2852          | 0.00          | 225 | 19.2.20.139 | 0010.7b6b.7215 |

```
CMTS01# show cable qos profile 225
```

| Service class | Prio | Max upstream bandwidth | Guarantee upstream bandwidth | Max downstream bandwidth | Max tx burst | TOS mask | TOS value | Create by  | B priv enab |
|---------------|------|------------------------|------------------------------|--------------------------|--------------|----------|-----------|------------|-------------|
| 225           | 0    | 256000                 | 0                            | 0                        | 0            | 0x0      | 0x0       | management | no          |

**Related Commands**

| Command                          | Description                                                                    |
|----------------------------------|--------------------------------------------------------------------------------|
| <b>cable qos profile</b>         | Configures a QoS profile.                                                      |
| <b>show cable qos permission</b> | Displays the status of permissions for changing QoS tables for a cable router. |
| <b>show cable qos profile</b>    | Displays the QoS profiles that have been defined.                              |

# cable qos pre-registration

To ensure that cable modems get online when a large number of existing online cable modems are actively transmitting data, use the **cable qos pre-registration us-priority** command.

**cable qos pre-registration us-priority** *priority-value*

|                    |                       |                                                                                                                                                                |
|--------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>us-priority</b>    | Specifies the upstream priority to be assigned to the pre-registration traffic.                                                                                |
|                    | <i>priority-value</i> | Priority value of the QoS profile-2.                                                                                                                           |
|                    |                       | The valid range is from 0 to 7.                                                                                                                                |
|                    | <b>Note</b>           | When a cable modem begins initializing, its default upstream service flow is assigned a QoS profile-2 priority of zero. Zero is the lowest priority scheduled. |

|                 |                                                                             |
|-----------------|-----------------------------------------------------------------------------|
| Command Default | Zero is the default QoS profile-2 priority of the initializing cable modem. |
|-----------------|-----------------------------------------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCD2   | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>cable qos pre-registration</b> command allows the Cisco CMTS operators to enforce a profile on all cable modems that have not yet begun initialization. However, this command has no affect on cable modems that have already started initialization and may be having difficulties getting [w-]online. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                           |
|----------|---------------------------------------------------------------------------|
| Examples | The following example shows how to set the priority of the QoS profile-2. |
|----------|---------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# cable qos pre-registration us-priority 2
Router(config)#
```

|                  |                               |                                             |
|------------------|-------------------------------|---------------------------------------------|
| Related Commands | <b>Command</b>                | <b>Description</b>                          |
|                  | <b>show cable qos profile</b> | Displays the QoS profiles for a Cisco CMTS. |

# cable qos pro max-ds-burst

To define ERBA on the downstream for DOCSIS 1.0 cable modems, use the **cable qos promax-ds-burst** command in global configuration mode. To remove this ERBA setting from the QoS profile, use the **no** form of this command.

**cable qos pro max-ds-burst** *burst-size*

**no cable qos pro max-ds-burst**

|                           |                   |                                                   |
|---------------------------|-------------------|---------------------------------------------------|
| <b>Syntax Description</b> | <i>burst-size</i> | The QoS profile's downstream burst size in bytes. |
|---------------------------|-------------------|---------------------------------------------------|

|                        |                                                       |
|------------------------|-------------------------------------------------------|
| <b>Command Default</b> | This DOCSIS 1.0 configuration is disabled by default. |
|------------------------|-------------------------------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                  |
|------------------------|----------------|--------------------------------------------------------------------------------------|
|                        | 12.3(13a)BC    | This command was introduced for the Cisco uBR7100 Series and Cisco uB7246VXR router. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>To display ERBA settings as applied to DOCSIS 1.0 cable modems and QoS profiles on the Cisco CMTS, use the <b>show cable qos profile</b> command in Privileged EXEC mode.</p> <p>The following example of the <b>cable qos profile</b> command in global configuration mode illustrates changes to the <b>cable qos profile</b> command. Fields relating to the ERBA feature are shown in bold for illustration:</p> |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router(config)# cable qos pro 10 ?
grant-interval Grant interval
grant-size Grant size
guaranteed-upstream Guaranteed Upstream
max-burst Max Upstream Tx Burst
max-ds-burst Max Downstream Tx burst (cisco specific)
max-downstream Max Downstream
max-upstream Max Upstream
name QoS Profile name string (cisco specific)
priority Priority
privacy Cable Baseline Privacy Enable
tos-overwrite Overwrite TOS byte by setting mask bits to value
```

The following example of the **show cable qos profile** command illustrates that the maximum downstream burst has been defined, and is a management-created QoS profile:

```
Router# show cable qos pro
ID Prio Max Guarantee Max Max TOS TOS Create B IP prec.
 upstream upstream downstream tx mask value by priv rate
 bandwidth bandwidth bandwidth burst
1 0 0 0 0 0 0xFF 0x0 cmts(r) no no
2 0 64000 0 1000000 0 0xFF 0x0 cmts(r) no no
3 7 31200 31200 0 0 0xFF 0x0 cmts yes no
4 7 87200 87200 0 0 0xFF 0x0 cmts yes no
```

|    |   |       |   |       |      |      |      |      |     |    |
|----|---|-------|---|-------|------|------|------|------|-----|----|
| 6  | 1 | 90000 | 0 | 90000 | 1522 | 0xFF | 0x0  | mgmt | yes | no |
| 10 | 1 | 90000 | 0 | 90000 | 1522 | 0x1  | 0xA0 | mgmt | no  | no |
| 50 | 0 | 0     | 0 | 96000 | 0    | 0xFF | 0x0  | mgmt | no  | no |
| 51 | 0 | 0     | 0 | 97000 | 0    | 0xFF | 0x0  | mgmt | no  | no |

The following example illustrates the maximum downstream burst size in sample QoS profile 10 with the **show cable qos prof verbose** command in privileged EXEC mode:

```
Router# show cable qos pro 10 ver
Profile Index 10
Name
Upstream Traffic Priority 1
Upstream Maximum Rate (bps) 90000
Upstream Guaranteed Rate (bps) 0
Unsolicited Grant Size (bytes) 0
Unsolicited Grant Interval (usecs) 0
Upstream Maximum Transmit Burst (bytes) 1522
Downstream Maximum Transmit Burst (bytes) 100000
IP Type of Service Overwrite Mask 0x1
IP Type of Service Overwrite Value 0xA0
Downstream Maximum Rate (bps) 90000
Created By mgmt
Baseline Privacy Enabled no
```

## Usage Guidelines

If a cable modem registers with a QoS profile that matches one of the existing QoS profiles on the Cisco CMTS, then the maximum downstream burst size, as defined for that profile, is used instead of the default DOCSIS QoS profile of 1522.

For example, a DOCSIS 1.0 configuration that matches QoS profile 10 in the previous examples would be as follows:

```
03 (Net Access Control) = 1

04 (Class of Service Encodings Block)
 S01 (Class ID) = 1
 S02 (Maximum DS rate) = 90000
 S03 (Maximum US rate) = 90000
 S06 (US burst) = 1522
 S04 (US Channel Priority) = 1
 S07 (Privacy Enable) = 0
```

The maximum downstream burst size (as well as the ToS overwrite values) are not explicitly defined in the QoS configuration file because they are not defined in DOCSIS. However, because all other parameters are a perfect match to profile 10 in this example, then any cable modem that registers with these QoS parameters has a maximum downstream burst of 100000 bytes applied to it.

For further illustration, consider a scenario in which packets are set in lengths of 1000 bytes at 100 packets per second (pps). Therefore, the total rate is a multiplied total of 1000, 100, and 8, or 800kbps.

To change these settings, two or more traffic profiles are defined, with differing downstream QoS settings as desired. [Table 0-13](#) provides two examples of such QoS profiles for illustration:

**Table 0-13 Sample QoS Profiles with Differing ERBA (Maximum Downstream) Settings**

| QoS Profile Setting                       | QoS Profile 101    | QoS Profile 102    |
|-------------------------------------------|--------------------|--------------------|
| Maximum Downstream Transmit Burst (bytes) | max-burst 4000     | max-burst 4000     |
| Maximum Downstream Burst (bps)            | max-ds-burst 20000 | max-ds-burst 5000  |
| Maximum Downstream Bandwidth              | max-downstream 100 | max-downstream 100 |

In this scenario, both QoS profiles are identical except for the max-ds-burst size, which is set to 5000 in QoS profile 101 and 5000 in QoS profile 102.

#### Optimal Settings for DOCSIS 1.0 Downstream Powerburst

DOCSIS allows the setting different token bucket parameters for each service flow, including the token bucket burst size. When burst sizes are closer to 0, QoS is enforced in a stricter manner, allowing a more predictable sharing of network resources, and as a result easier network planning.

When burst sizes are larger, individual flows can transmit information faster (lower latency), although the latency variance can be larger as well.

For individual flows, a larger burst size is likely to be better. As long as the system is not congested, a large burst size reduces the chances of two flows transmitting at the same time, because each burst is likely to take less time to transmit. However, as channel bandwidth consumption increases, it is probably that large burst traffic would exceed the thresholds of buffer depths, and latency is longer than with well shaped traffic.

For additional information about the **cable qos profile** command and configuring QoS profiles, refer to the following documents on Cisco.com:

- *DOCSIS 1.1 for the Cisco CMTS*

| Related Commands | Command                          | Description                                                                    |
|------------------|----------------------------------|--------------------------------------------------------------------------------|
|                  | <b>cable qos profile</b>         | Configures a QoS profile.                                                      |
|                  | <b>show cable qos permission</b> | Displays the status of permissions for changing QoS tables for a cable router. |
|                  | <b>show cable qos profile</b>    | Displays the QoS profiles that have been defined.                              |



# cable queue-limit

To set the DOCSIS service flow queue limits to non-default values on the Cisco CMTS, use the **cable queue-limit** command in global configuration mode. To disable this function, use the **no** form of this command.

**cable queue-limit** *queue\_limit\_in\_ms* **bandwidth-threshold** *threshold\_value*

**no cable queue-limit** *queue\_limit\_in\_ms* **bandwidth-threshold** *threshold\_value*

## Syntax Description

|                                                                                                                           |                                                                             |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <i>queue_limit_in_ms</i>                                                                                                  | Queue limit in milliseconds. The valid range is from 1 to 200 milliseconds. |
| <i>threshold_value</i>                                                                                                    | Queue bandwidth threshold in Kbps. The valid range is from 0 to 1000000.    |
| <b>Note</b> The queue limit specification take effect only if the queue shape rate exceeds the queue-bandwidth threshold. |                                                                             |

## Command Default

This command is not enabled by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                           |
|--------------|--------------------------------------------------------|
| 12.2(33)SCG  | This command was introduced.                           |
| 12.2(33)SCG1 | Support was added for the Cisco uBR7200 Series router. |

## Usage Guidelines

The queue size on the downstream interfaces can be adjusted to be different than the default settings; for example, when the application can benefit from a larger queue size on a high speed queue.

The queue size in packets is calculated as:

$\text{queue-size} = \text{bandwidth (Kbps)} * \text{queue-limit (ms)} / 8 / 1518$

(where 1518 B is the packet size, and bandwidth is the same as queue shape rate).

## Associated Features

The **cable queue-limit bandwidth-threshold** command is used to configure the following features:

- [DOCSIS WFQ Scheduler on the Cisco CMTS Routers](#)

## Examples

The following example shows how to set the queue limit to 25 ms at max-rate when bandwidth exceeds 100000 Kbps:

```
Router(config)# cable queue-limit 25 bandwidth-threshold 100000
```

| Related Commands | Command                         | Description                                                                                                                                                              |
|------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>show cable modem queue</b>   | Displays the queue information on the Cisco uBR7200 router.                                                                                                              |
|                  | <b>show pxf cpu queue</b>       | Displays parallel express forwarding (PXF) queuing, link queue statistics, and the service flow queue information including the queue size on the Cisco uBR10012 router. |
|                  | <b>show pxf cable interface</b> | Displays information about a particular service ID (SID), including information about the status of queues used by the SID on the Cisco uBR10012 router                  |

# cable rate-limit-algorithm min-plus-excess

To enable a service flow to receive not only its configured minimum reserved traffic rate bandwidth but also its expected excess traffic rate bandwidth, use the **cable rate-limit-algorithm min-plus-excess** command in global configuration mode. To disable this configuration, use the **no** form of this command.

**cable rate-limit-algorithm min-plus-excess**

**no cable rate-limit-algorithm min-plus-excess**

## Syntax Description

|                        |                                                                                                                                |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>min-plus-excess</b> | Specifies that the service flow requires a bandwidth of the specified minimum reserved traffic rate, plus excess traffic rate. |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------|

## Command Default

When the **cable rate-limit-algorithm min-plus-excess** command is not configured, service flows with the minimum reserved traffic rate configured are guaranteed only their minimum reserved traffic rate. Excess traffic rate bandwidth may not be shared evenly among service flows with or without the minimum rate configured.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCD5 | This command was introduced. |

## Usage Guidelines

The **cable rate-limit-algorithm min-plus-excess** command enables a service flow to receive its configured minimum reserved traffic rate bandwidth plus its expected excess traffic rate bandwidth.

## Examples

The following example shows how to specify the **min-plus-excess** keyword:

```
Router> enable
Router# configure terminal
Router(config)# cable rate-limit-algorithm argument min-plus-excess
Router(config)#
```

| Related Commands | Command                                   | Description                                                                                                                                |
|------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>show interface cable mac-scheduler</b> | Displays the current time-slot scheduling state, statistics, and weighted fair queuing (WFQ) parameters for the indicated cable interface. |
|                  | <b>show interface cable service-flow</b>  | Displays the attributes of the DOCSIS service flows on a cable interface.                                                                  |

# cable rcc-template

To define a receive channel configuration (RCC) template, use the **cable rcc-template** command in global configuration mode.

**cable rcc-template** *index*

|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>index</i> Specifies an RCC template ID in the range 1 to 255. |
|---------------------------|------------------------------------------------------------------|

|                        |                                                                                                                                                            |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | If an RCC template is not assigned to a cable interface, the CMTS will use the wideband cable interface generated RCC for a receive channel profile (RCP). |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCB    | This command was introduced. |

|                         |                                                                                                                      |
|-------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | A valid RCC template consists of a configured RCP ID, a receive module (RM) entry, and a receive channel (RC) entry. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------|

First, you define an RCC template for an RCP, and then assign the template to a cable interface to generate RCCs based on the actual DS channel configuration.

**Note**

When assigning an RCC template to a cable interface, use this command in interface configuration mode.

|                 |                                                            |
|-----------------|------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to define an RCC template: |
|-----------------|------------------------------------------------------------|

```
Router# configure terminal
Router(config)# cable rcc-template 1
```

| <b>Related Commands</b> | <b>Command</b>         | <b>Description</b>                                                |
|-------------------------|------------------------|-------------------------------------------------------------------|
|                         | <b>rcp-id</b>          | Specifies an ID for the Receive Channel Profile.                  |
|                         | <b>receive-module</b>  | Specifies a receive module entry in the form of a numeric value.  |
|                         | <b>receive-channel</b> | Specifies a receive channel entry in the form of a numeric value. |

# cable rcp-control

To enable the receive channel profile (RCP) reporting with verbose description, use the **cable rcp-control** command in interface configuration mode. To revert to the default simple RCP reporting, use the **no** form of this command.

**cable rcp-control verbose**

**no cable rcp-control**

## Syntax Description

|                |                                                                                                                |
|----------------|----------------------------------------------------------------------------------------------------------------|
| <b>verbose</b> | Enables RCP reporting with verbose description that contains complete subtype encodings defined in DOCSIS 3.0. |
|----------------|----------------------------------------------------------------------------------------------------------------|

## Command Default

If this command is not used, cable modems use the default RCP reporting method that contains only the RCP identifiers.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

Use this command to enable a CM to send detailed RCP data in the registration request. This detailed RCP data can be verified using the **debug cable registration** command. This verbose RCP data is useful while configuring a receive channel configuration (RCC) template.

## Examples

The following example shows how to enable RCP reporting with verbose description on a cable interface on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable 8/0/0
Router(config-if)# cable rcp-control verbose
```

## Related Commands

| Command                         | Description                                              |
|---------------------------------|----------------------------------------------------------|
| <b>debug cable registration</b> | Displays debug messages for the CM registration process. |
| <b>cable rcc-template</b>       | Defines a Receive Channel Configuration (RCC) template.  |

# cable redundancy hashfilter

To set the MAC address and DDC node mappings of the DDC redundancy scheme, use the **cable redundancy hashfilter** command in global configuration mode. This hash filter is to be shared by all DDC nodes (routers) in the redundancy scheme. To remove the hash filter from the Cisco CMTS router, use the **no** form of this command.

```
cable redundancy hashfilter hash_id {type namestring | mac-mask mac-mask | mac-map
mac-address node node_id | oui-map oui node node_id}
```

```
no cable redundancy hashfilter
```

## Syntax Description

|                                   |                                                                                                                                                                                                                                                |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>hash_id</i>                    | Unique ID for the shared hash filter. Multiple (differently named) hash filters are supported in the same Cisco DDC Redundancy scheme at the same time, though only one hash filter can be enabled at any one time. Supported range is 1 to 3. |
| <b>type</b> <i>namestring</i>     | Alphanumeric hash filter name. Only the namestring of <b>default</b> is supported at this time.                                                                                                                                                |
| <b>mac-mask</b> <i>mac-mask</i>   | Specifies the number of bits in the cable modem's MAC address to be used by the hashing algorithm.                                                                                                                                             |
| <b>mac-map</b> <i>mac-address</i> | A manually configured MAC address for the DDC node (overrides any default MAC address configured on the router).                                                                                                                               |
| <b>node</b> <i>node_id</i>        | This value overrides the node that all cable modems with the shared <i>mac-address</i> or <i>oui</i> value will use, and updates the MAC address mapping in the hash filter.                                                                   |
| <b>oui-map</b> <i>oui</i>         | This value overrides the node that all cable modems with the shared OUI value will use, and updates the OUI address mapping in the hash filter.                                                                                                |

## Command Default

- Cable redundancy hash filters are disabled (not configured) by default.
- Only the hash filter name of **default** is supported at this time.

## Command Modes

Global configuration (config)

## Command History

| Release            | Modification                                                                 |
|--------------------|------------------------------------------------------------------------------|
| Release 12.3(9a)BC | This command was introduced on the Cisco uBR7246 universal broadband router. |

## Usage Guidelines

This command is used in the early stages of configuring DDC Redundancy on all DDC nodes (routers) in the scheme. For additional information in context, refer to the “Configuring Cisco DDC Redundancy on the Cisco uBR7246VXR Universal Broadband Router” feature documentation on Cisco.com.

**Note**

This configuration must be present and identical on each CMTS router participating in the DDC redundancy scheme.

**Examples**

The following example implements the **cable redundancy hashfilter** command in four sequential steps, completing the entire mapping information required for one DDC node in a redundancy scheme of two routers:

```
Router# cable redundancy hashfilter 1 type default
Router# cable redundancy hashfilter 1 macmask FFFF.FF00.0000
Router# cable redundancy hashfilter 1 macmap 0007.0e03.68ad node 2
Router# cable redundancy hashfilter 1 ouimap 00070e node 1
```

**Related Commands**

| Command                      | Description                                                                                                               |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>cable redundancy myid</b> | Sets the total number of Cisco DDC nodes (routers) in the DDC Redundancy scheme, and sets the ID of the current DDC node. |
| <b>cable redundancy node</b> | Configures the DDC node with active or standby state.                                                                     |
| <b>show cable redundancy</b> | Displays the current DDC redundancy configurations and status.                                                            |



# cable redundancy myid

To set the total number of Cisco DDC nodes (routers) in the DDC Redundancy scheme, and to set the ID of the current DDC node, use the **cable redundancy myid** command in global configuration mode. To remove a DDC node ID from the router, use the **no** form of this command.

**cable redundancy myid** *node\_id* **nodes** *nodes*

**no cable redundancy myid** *node\_id*

## Syntax Description

|                |                                                                                                                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>node_id</i> | A unique identifier for the Cisco DDC node currently being configured. The value must be 1 or greater (not to exceed the value used for <i>nodes</i> ). This value must be unique on each CMTS that participates in the scheme. |
| <i>nodes</i>   | Total number of Cisco CMTS routers participating in the DDC redundancy scheme (range 1 to 3). This value must be identical on all DDC nodes (routers).                                                                          |

## Command Default

DDC Redundancy is disabled and DDC nodes (routers) are not configured for DDC redundancy by default.

## Command Modes

Global configuration (config)

## Command History

| Release            | Modification                                                                 |
|--------------------|------------------------------------------------------------------------------|
| Release 12.3(9a)BC | This command was introduced on the Cisco uBR7246 universal broadband router. |

## Usage Guidelines

This configuration must be present (identical except *node\_id*) on all DDC nodes (routers) participating in the scheme.

This command is used in the early stages of configuring DDC Redundancy on all DDC nodes (routers) in the scheme. For additional information in context, refer to the “Configuring Cisco DDC Redundancy on the Cisco uBR7246VXR Universal Broadband Router” feature documentation on Cisco.com.

## Examples

The following example configures the DDC node (router) ID to be 2 in a scheme in which there are three DDC nodes total.

```
Router# cable redundancy myid 2 nodes 3
```

## Related Commands

| Command                      | Description                                                    |
|------------------------------|----------------------------------------------------------------|
| <b>cable redundancy node</b> | Configures the DDC node with active or standby state.          |
| <b>show cable redundancy</b> | Displays the current DDC redundancy configurations and status. |

# cable redundancy node

To set the DDC node (router) with which a subinterface is associated, and to set the state for that interface, use the **cable redundancy node** command in subinterface configuration mode. To remove this configuration from the router, use the **no** form of this command.

**cable redundancy node** *node\_id* {**active** | **standby**} [**force**]

**no cable redundancy node** *node\_id* {**active** | **standby**}

## Syntax Description

|                |                                                                                                                         |
|----------------|-------------------------------------------------------------------------------------------------------------------------|
| <i>node_id</i> | DDC node (router) with which the subinterface is associated. The range is the number of DDC nodes in the scheme.        |
| <b>force</b>   | Optional keyword forces the subinterface into the standby state regardless of the number of active voice or E911 calls. |

## Command Default

DDC switchover events are disabled by default and must be manually initiated on a case-by-case basis.

## Command Modes

Subinterface configuration (config-subif)

## Command History

| Release            | Modification                                                                 |
|--------------------|------------------------------------------------------------------------------|
| Release 12.3(9a)BC | This command was introduced on the Cisco uBR7246 universal broadband router. |

## Usage Guidelines

This command can be used in the context of DDC configuration, testing or forced switchover events. Refer to earlier procedures in this document for additional information.



### Note

Use of this command is subject to additional constraints described in the “Active Voice Call Protection in Cisco DDC Redundancy” section of the “Configuring Cisco DDC Redundancy on the Cisco uBR7246VXR Universal Broadband Router” feature documentation on Cisco.com..

## Examples

The following command sequence sets the DDC node states in a scheme with two DDC nodes (routers), then forces a switchover event on DDC node 1 that puts it into *standby* state.

```
Router(config-subif)# cable redundancy node 2 active
Router(config-subif)# cable redundancy node 1 standby
Router(config-subif)# cable redundancy node 1 standby force
```

## Related Commands

| Command                      | Description                                                                                                               |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>cable redundancy myid</b> | Sets the total number of Cisco DDC nodes (routers) in the DDC Redundancy scheme, and sets the ID of the current DDC node. |
| <b>show cable redundancy</b> | Displays the current DDC redundancy configurations and status.                                                            |

# cable redundancy node frequency

To set the downstream frequencies for each node participating in the scheme other than the current DDC node (router), use the **cable redundancy node frequency** command in interface configuration mode. This frequency is used to switch cable modems to the downstream frequency of the backup interface (on another DDC node) via DFO and DCC messages. To remove this setting from the router, use the **no** form of this command.

**cable redundancy node** *node\_id* **frequency** *frequency*

**no cable redundancy node** *node\_id* **frequency** *frequency*

|                    |                  |                                                          |
|--------------------|------------------|----------------------------------------------------------|
| Syntax Description | <i>node_id</i>   | DDC target node ID for which the frequency is being set. |
|                    | <i>frequency</i> | Downstream frequency of the target interface.            |

|                 |                                                            |
|-----------------|------------------------------------------------------------|
| Command Default | Cable downstream frequency override is enabled by default. |
|-----------------|------------------------------------------------------------|

|               |                                          |
|---------------|------------------------------------------|
| Command Modes | Interface configuration mode (config-if) |
|---------------|------------------------------------------|

| Command History | Release            | Modification                                                                 |
|-----------------|--------------------|------------------------------------------------------------------------------|
|                 | Release 12.3(9a)BC | This command was introduced on the Cisco uBR7246 universal broadband router. |

|                  |                                                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command must be present on each cable interface participating in the scheme, regardless of its bundle status. |
|------------------|--------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                           |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example configures the downstream frequency of DDC node 1 to be 435000000.</p> <pre>Router(config-if)# cable redundancy node 1 frequency 435000000</pre> |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                           | Description                                                                                                               |
|------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable redundancy myid</b>      | Sets the total number of Cisco DDC nodes (routers) in the DDC Redundancy scheme, and sets the ID of the current DDC node. |
|                  | <b>cable redundancy node</b>      | Configures the DDC node with active or standby state.                                                                     |
|                  | <b>cable redundancy target</b>    | Configures the DDC node by setting the target DDC node (router) to use in a DDC switchover event.                         |
|                  | <b>cable redundancy threshold</b> | Configures the DDC node by setting the active voice call threshold on the current DDC node (router)                       |
|                  | <b>show cable redundancy</b>      | Displays the current DDC redundancy configurations and status.                                                            |

# cable redundancy target

To set the target DDC node (router) to use in a DDC switchover event, use the **cable redundancy target** command in interface configuration mode. To remove this configuration from the router, use the **no** form of this command.

**cable redundancy target** *node\_id*

**no cable redundancy target** *node\_id*

## Syntax Description

|                |                                                      |
|----------------|------------------------------------------------------|
| <i>node_id</i> | Target node ID (in relation to the current DDC node) |
|----------------|------------------------------------------------------|

## Command Default

When this command is not present, the default target node is the next higher node in the scheme.

## Command Modes

Interface configuration (config-if)

## Command History

| Release            | Modification                                                                 |
|--------------------|------------------------------------------------------------------------------|
| Release 12.3(9a)BC | This command was introduced on the Cisco uBR7246 universal broadband router. |

## Usage Guidelines

The downstream frequency that is used in a DDC switchover event is the frequency set on the respective target DDC node, as set with this command.



### Note

This command may be present on each participating cable interface, regardless of its bundle status.

When this command is not present, the default target node is the next higher node in the scheme (the next higher *node\_id* value in the scheme). For example, if there are three participating nodes, the default target nodes are as follows (respectively):

- If the current node is 1, the target node is 2.
- If the current node is 2, the target node is 3.
- If the current node is 3, the target node is 1.

## Examples

The following example configures the target node on the current router to be DDC node 1, often referred to as CMTS A in additional sections of this document.

```
Router(config-if)# cable redundancy target 1
```

## Related Commands

| Command                      | Description                                                                                                               |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>cable redundancy myid</b> | Sets the total number of Cisco DDC nodes (routers) in the DDC Redundancy scheme, and sets the ID of the current DDC node. |
| <b>cable redundancy node</b> | Configures the DDC node with active or standby state.                                                                     |

| Command                                | Description                                                                                                                   |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>cable redundancy node frequency</b> | Configures the DDC scheme by setting the DS frequencies for each node in the scheme other than the current DDC node (router). |
| <b>cable redundancy threshold</b>      | Configures the DDC node by setting the active voice call threshold on the current DDC node (router).                          |
| <b>show cable redundancy</b>           | Displays the current DDC redundancy configurations and status.                                                                |

# cable redundancy threshold

To set the active voice call threshold on the current DDC node (router), use the **cable redundancy threshold** command in interface configuration mode. To remove this configuration from the router, use the **no** form of this command.

**cable redundancy threshold** *max-calls*

**no cable redundancy threshold**

| Syntax Description                     | <i>max-calls</i> The threshold value for the number of active voice calls.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------|--------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------------------------------------------|
| Command Default                        | The threshold for maximum calls is not set by default.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| Command Modes                          | Interface configuration (config-if)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| Command History                        | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>Release 12.3(9a)BC</td><td>This command was introduced on the Cisco uBR7246 universal broadband router.</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | Release | Modification | Release 12.3(9a)BC           | This command was introduced on the Cisco uBR7246 universal broadband router.                                              |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| Release                                | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| Release 12.3(9a)BC                     | This command was introduced on the Cisco uBR7246 universal broadband router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| Usage Guidelines                       | <p>If the number of active voice calls exceeds this value, a DDC switchover does not take place unless it is forced by using the <b>cable redundancy node <i>node_id</i> standby force</b> subinterface configuration command.</p> <p>If the command is configured on a bundle master, the threshold is used to compare with the total number of voice calls in the bundle. This command is not accepted on interfaces configured as bundle slaves.</p> <p>If this threshold is not configured, this check does not occur and the DDC switchover proceeds regardless of how many voice calls are active. This is subject to additional constraints described in the “Call Priority in Cisco DDC Redundancy” section of the “Configuring Cisco DDC Redundancy on the Cisco uBR7246VXR Universal Broadband Router” feature documentation on Cisco.com.</p> |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| Examples                               | <p>The following example configures DDC redundancy not to take place if there are more than 20 active or E911 calls at the time a DDC switchover event is attempted or requested.</p> <pre>Router(config-if)# cable redundancy threshold 20</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| Related Commands                       | <table><tr><th>Command</th><th>Description</th></tr><tr><td><b>cable redundancy myid</b></td><td>Sets the total number of Cisco DDC nodes (routers) in the DDC Redundancy scheme, and sets the ID of the current DDC node.</td></tr><tr><td><b>cable redundancy node</b></td><td>Configures the DDC node with active or standby state.</td></tr><tr><td><b>cable redundancy node frequency</b></td><td>Configures the DDC scheme by setting the DS frequencies for each node in the scheme other than the current DDC node (router).</td></tr><tr><td><b>cable redundancy target</b></td><td>Configures the DDC node (<i>node_id</i>) by setting the target DDC node (router) to use in a DDC switchover event.</td></tr><tr><td><b>show cable redundancy</b></td><td>Displays the current DDC redundancy configurations and status.</td></tr></table>   |  | Command | Description  | <b>cable redundancy myid</b> | Sets the total number of Cisco DDC nodes (routers) in the DDC Redundancy scheme, and sets the ID of the current DDC node. | <b>cable redundancy node</b> | Configures the DDC node with active or standby state. | <b>cable redundancy node frequency</b> | Configures the DDC scheme by setting the DS frequencies for each node in the scheme other than the current DDC node (router). | <b>cable redundancy target</b> | Configures the DDC node ( <i>node_id</i> ) by setting the target DDC node (router) to use in a DDC switchover event. | <b>show cable redundancy</b> | Displays the current DDC redundancy configurations and status. |
| Command                                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| <b>cable redundancy myid</b>           | Sets the total number of Cisco DDC nodes (routers) in the DDC Redundancy scheme, and sets the ID of the current DDC node.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| <b>cable redundancy node</b>           | Configures the DDC node with active or standby state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| <b>cable redundancy node frequency</b> | Configures the DDC scheme by setting the DS frequencies for each node in the scheme other than the current DDC node (router).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| <b>cable redundancy target</b>         | Configures the DDC node ( <i>node_id</i> ) by setting the target DDC node (router) to use in a DDC switchover event.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |
| <b>show cable redundancy</b>           | Displays the current DDC redundancy configurations and status.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |         |              |                              |                                                                                                                           |                              |                                                       |                                        |                                                                                                                               |                                |                                                                                                                      |                              |                                                                |

# cable registration-timeout

To set the value of the DOCSIS registration timeout timer (T9 timer) on a particular interface, use the **cable registration-timeout** command in cable interface configuration mode. To reset the timeout value to the default, use the **no** form of this command.

**cable registration-timeout** *minutes*

**no cable registration-timeout**

## Syntax Description

*minutes* Sets the value of the DOCSIS CM registration timeout timer (T9 timer). Valid range is from 2 to 60 minutes. The default is 3 minutes.

## Command Default

3 minutes

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release    | Modification                 |
|------------|------------------------------|
| 12.0(7)XR2 | This command was introduced. |

## Usage Guidelines

The DOCSIS 1.1 specification states that the CMTS should enforce the T9 timer, which is a registration timeout timer that specifies the maximum time allowed between the CMTS sending a successful Ranging Response (RNG-RSP) message and the CM replying with a Registration Request (REG-REQ) message. If this timer expires, the CMTS must remove the CM from its list of active CMs, and the CM must restart the registration process.

The **cable registration-timeout** command can be used to customize the value of the T9 timer for each cable interface, to accommodate the CMs using that interface.

## Examples

The following example shows the registration timeout value being increased from 3 minutes to 10 minutes:

```
Router# configure terminal
Router (config)# interface c6/0
Router(config-if)# cable registration-timeout 10
Router(config-if)# exit
Router(config)#
```

# cable relay-agent-option

To enable the system to insert the CM MAC address into a Dynamic Host Configuration Protocol (DHCP) packet received from a CM or host and forward the packet to a DHCP server, use the **cable relay-agent-option** command in cable interface configuration mode. To disable MAC address insertion, use the **no** form of this command.

**cable relay-agent-option**

**no cable relay-agent-option**

**Syntax Description** This command has no keywords or arguments.

**Command Default** **no cable relay-agent-option**

**Command Modes** Interface configuration (cable interface only)

| Command History | Release                                | Modification                                                                                            |
|-----------------|----------------------------------------|---------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA                                | This command was introduced.                                                                            |
|                 | 12.0 mainline, 12.1(2)EC1, 12.0(10) SC | This command was made obsolete and was replaced by the <b>ip dhcp relay information option</b> command. |

**Usage Guidelines** This functionality enables the use of DHCP Option 82 to allow a DHCP server to identify the CM sending the request and to initiate the appropriate action based on this information. On Cisco IOS Release 12.0 and later releases, use the **ip dhcp relay information option** command to enable Option 82 processing.

**Examples** The following example shows how to enable the insertion of DHCP relay agent information into DHCP packets:

```
Router(config-if)# cable relay-agent-option
```

| Related Commands | Command                     | Description                                                                                                                             |
|------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable helper-address</b> | Specifies a destination IP address for User Datagram Protocol (UDP) broadcast (DHCP) packets.                                           |
|                  | <b>cable dhcp-giaddr</b>    | Modifies the GIADDR field of DHCPDISCOVER and DHCPREQUEST packets with a Relay IP address before they are forwarded to the DHCP server. |
|                  | <b>cable source-verify</b>  | Turns on CM upstream verification.                                                                                                      |



| Command                                         | Description                                                                                                                            |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd dhcp-authenticate</b> | Enforces the telco-return CM to use a specific DHCP server.                                                                            |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CM must access.                                                     |
| <b>ip dhcp relay information option</b>         | Enables the system to insert the CM MAC address into a DHCP packet received from a CM or host and forward the packet to a DHCP server. |
| <b>ip dhcp smart-relay</b>                      | Monitors client retransmissions when address pool depletion occurs.                                                                    |

# cable resiliency ds-bonding

To enable the Downstream Resiliency Bonding Group feature and to create a resiliency bonding group (RBG) on the Cisco CMTS router, use the **cable resiliency ds-bonding** command in global configuration mode. To disable this feature, use the **no** form of this command.

```
cable resiliency ds-bonding

no cable resiliency ds-bonding
```

Command DefaultNone

Command ModesGlobal configuration (config)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

Usage GuidelinesThe **cable resiliency ds-bonding** command is used to configure the Downstream Resiliency Bonding Group feature.

ExamplesThe following example shows how to configure the Downstream Resiliency Bonding Group feature:

```
Router(config)# cable resiliency ds-bonding
```

Associated FeaturesThe **cable ds-resiliency** command is used to configure the following feature:

[Downstream Resiliency Bonding Group](#)

| Related Commands | Command                            | Description                                                                                |
|------------------|------------------------------------|--------------------------------------------------------------------------------------------|
|                  | <b>cable ds-resiliency</b>         | Reserves a resiliency bonding group for a line card on the Cisco CMTS router.              |
|                  | <b>show cable modem resiliency</b> | Displays resiliency status of the cable modem in resiliency mode on the Cisco CMTS router. |
|                  | <b>show cable resiliency</b>       | Displays all information about resiliency bonding groups on the Cisco CMTS router.         |

# cable resiliency traps-interval

To set the interval at which traps must be sent for Wideband Resiliency related events for each cable modem on the Cisco CMTS, use the **cable resiliency traps-interval** command in global configuration mode. To disable the interval, use the **no** form of this command.

**cable resiliency traps-interval** *count*

**no cable resiliency traps-interval**

## Syntax Description

|              |                                                                                                                                          |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <i>count</i> | Time interval (in seconds) at which the traps must be sent for each cable modem. The valid range is from 0 to 86400. Default value is 1. |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

By default, the resiliency trap interval is enabled and set as 1 second.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCG2 | This command was introduced. |

## Usage Guidelines

When the network has less number of cable modems with resiliency events occurring at a given time, use the default value of 1 second interval. But if the network has many cable modems with resiliency events occurring at a given time, set the interval to a higher value.

## Examples

The following example shows how to set the time interval to 10 second for sending traps for each cable modem:

```
Router(config)# cable resiliency traps-interval 10
```

## Associated Features

The **cable resiliency traps-interval** command is associated with the [Wideband Modem Resiliency](#) feature.

## Related Commands

| Command                            | Description                                                                                |
|------------------------------------|--------------------------------------------------------------------------------------------|
| <b>show cable modem resiliency</b> | Displays resiliency status of the cable modem in resiliency mode on the Cisco CMTS router. |

# cable rf-adapt timer

To configure timers for RF adaptation, use the **cable rf-adapt timer** command in global configuration mode. To disable the timers, use the **no** form of this command.

**cable rf-adapt timer** {*general time* | *candidate time* | *relocation time*}

**no cable rf-adapt timer**

|                           |                   |                                                                                                                                                                                                                                    |
|---------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>general</b>    | Period when the RF adaptation process examines the physical layer statistics of all modems on RF adaptation-enabled upstream channels. The valid range is from 1 to 300 seconds. The default value is 10 seconds.                  |
|                           | <b>candidate</b>  | Period when the RF adaptation process examines the physical layer statistics of modems flagged as downgrade and/or upgrade candidates. The valid range is from 1 to 300 seconds. The default value is 1 second.                    |
|                           | <b>relocation</b> | Period when the RF adaptation process performs a single relocation of a candidate modem from its current upstream channel to the appropriate destination. The valid range is from 1 to 300 seconds. The default value is 1 second. |
|                           | <b>time</b>       | Time in seconds. The valid range is from 1 to 300.                                                                                                                                                                                 |

**Command Default** Default timer values are used.

**Command Modes** Global configuration (config)

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCF    | This command was introduced. |

**Examples** The following example shows how to set timers for cable modem upstream RF adaptation:

```
Router(config)# cable rf-adapt timer general 120
Router(config)# cable rf-adapt timer candidate 10
Router(config)# cable rf-adapt timer relocation 5
```

|                         |                                                  |                                                                                                                                                                       |
|-------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>                                   | <b>Description</b>                                                                                                                                                    |
|                         | <b>cable upstream rf-adapt</b>                   | Enables RF adaptation on the physical upstream channel.                                                                                                               |
|                         | <b>cable upstream rf-adapt (logical channel)</b> | Configures the primary upstream logical channel and secondary upstream logical channel.                                                                               |
|                         | <b>cable upstream threshold</b>                  | Configures the upstream for the signal-to-noise ratio (SNR) and forward error correction (FEC) threshold values to be used in determining the allowable noise levels. |

| Command                                    | Description                                                                                                                                                               |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable upstream threshold hysteresis</b> | Configures the hysteresis value to be used in conjunction with the dynamic modulation upgrade thresholds.                                                                 |
| <b>cable upstream threshold rf-adapt</b>   | Configures the upstream RF adaptation threshold value, which prevents excessive relocation of modems from the primary upstream channel to the secondary upstream channel. |
| <b>show cable modem rf-adapt</b>           | Displays the RF adaptation history.                                                                                                                                       |
| <b>show cable rf-adapt</b>                 | Displays the downgrade and upgrade candidate lists.                                                                                                                       |

# cable rf-bandwidth-percent

To enable either static or dynamic bandwidth sharing for a modular cable (MC) interface, use the **cable rf-bandwidth-percent** command in interface configuration mode. To remove bandwidth sharing for the MC interface, use the **no** form of this command.

**cable rf-bandwidth-percent** *percent-value* [**remaining ratio** *excess-value*]

**no cable rf-bandwidth-percent**

## Syntax Description

|                        |                                                                                                                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>percent-value</i>   | Specifies static bandwidth allocation of a downstream RF channel. The range is 1–96. The default is 0.                                                                                                              |
| <b>remaining ratio</b> | (Optional) Specifies the ratio of the remaining or excess bandwidth that can be allocated to the modular cable channel.<br><br><b>Note</b> This option is only available when dynamic bandwidth sharing is enabled. |
| <i>excess-value</i>    | Specifies the value of excess bandwidth that can be allocated to the modular cable channel. The range is 1–100. The default value is 1.                                                                             |

## Command Default

The default static bandwidth percentage for a modular cable interface is 0.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.      |
| 12.3(23)BC1 | The <b>remaining ratio</b> option was added.                    |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. |

## Usage Guidelines

The total percentage of the RF channel bandwidth allocated to both the modular cable (MC) and wideband interfaces must not exceed 96 percent. The remaining 4 percent of the bandwidth is reserved for minislots allocation packet (MAP) and other MAC management messages (MMM) DOCSIS traffic using this RF channel as its primary channel.

When dynamic bandwidth sharing (DBS) is enabled on the MC interface, the bandwidth percentage is converted to a committed information rate (CIR) value for the corresponding link queue. By re-interpreting the bandwidth percentage value as a CIR value for the MC interface, the interface receives, at minimum, the configured percent of bandwidth and more when the RF channel's bandwidth is not consumed by other interfaces sharing the same RF channel. The **remaining ratio** option is only available when DBS is enabled using the **cable dynamic-bw-sharing** command.

If the **cable rf-bandwidth-percent** command is not configured and DBS is enabled, no bandwidth is reserved for the MC interface and it is effectively in the protocol down state—the MC link queue is not created. Static bandwidth sharing (the default) or DBS can be configured on an MC interface, but you cannot have both on the same interface.

## Examples

The following is an example of static bandwidth allocation configuration:

```
Router# configure terminal
Router(config)# interface modular-cable 1/0/0:0
Router(config-if)# cable rf-bandwidth-percent 70
```

The following is an example of dynamic bandwidth sharing configuration:

```
Router# configure terminal
Router(config)# interface modular-cable 1/0/0:0
Router(config-if)# shutdown
Router(config-if)# cable dynamic-bw-sharing
Router(config-if)# no shutdown
Router(config-if)# cable rf-bandwidth-percent 70 remaining ratio 25
```

## Related Commands

| Command                          | Description                                                                                                 |
|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>cable dynamic-bw-sharing</b>  | Enables dynamic bandwidth sharing on a specific modular cable or wideband cable interface.                  |
| <b>cable rf-channel</b>          | Associates an RF channel on a Wideband SPA with a wideband channel and allocates bandwidth.                 |
| <b>show pxf cable controller</b> | Displays information about the RF channel Versatile Traffic Management System (VTMS) links and link queues. |
| <b>show pxf cpu queue</b>        | Displays parallel express forwarding (PXF) queueing and link queue statistics.                              |

# cable rf-change-dampen-time

To configure the amount of time a radio frequency (RF) channel must remain in its new state (either up or down), use the **cable rf-change-dampen-time** command in global configuration mode. To restore the default value, use the **no** form of this command.

**cable rf-change-dampen-time** *seconds*

**no cable rf-change-dampen-time**

| Syntax Description             | <i>seconds</i><br>Specifies the amount of time in seconds for a non-primary RF channel to remain in its new state. The valid range is 1 to 65535. The default value is 30.                                                           |  |         |              |                                |                                                                                                            |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------|--------------|--------------------------------|------------------------------------------------------------------------------------------------------------|
| Command Default                | If this command is not used, the default value of 30 seconds will be restored.                                                                                                                                                       |  |         |              |                                |                                                                                                            |
| Command Modes                  | Global configuration (config)                                                                                                                                                                                                        |  |         |              |                                |                                                                                                            |
| Command History                | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>12.2(33)SCB</td><td>This command was introduced.</td></tr></table>                                                                                                      |  | Release | Modification | 12.2(33)SCB                    | This command was introduced.                                                                               |
| Release                        | Modification                                                                                                                                                                                                                         |  |         |              |                                |                                                                                                            |
| 12.2(33)SCB                    | This command was introduced.                                                                                                                                                                                                         |  |         |              |                                |                                                                                                            |
| Usage Guidelines               | This command applies to all non-primary RF channels on a CMTS.                                                                                                                                                                       |  |         |              |                                |                                                                                                            |
| Examples                       | <p>The following example shows how to specify the amount of time for a non-primary RF channel to remain in its new state:</p> <pre>Router# <b>configure terminal</b><br/>Router(config)# <b>cable rf-change-dampen-time 10</b></pre> |  |         |              |                                |                                                                                                            |
| Related Commands               | <table><tr><th>Command</th><th>Description</th></tr><tr><td><b>cable rf-change-trigger</b></td><td>Specifies the persistence thresholds for an event before the event triggers an action for the cable modem.</td></tr></table>      |  | Command | Description  | <b>cable rf-change-trigger</b> | Specifies the persistence thresholds for an event before the event triggers an action for the cable modem. |
| Command                        | Description                                                                                                                                                                                                                          |  |         |              |                                |                                                                                                            |
| <b>cable rf-change-trigger</b> | Specifies the persistence thresholds for an event before the event triggers an action for the cable modem.                                                                                                                           |  |         |              |                                |                                                                                                            |



## cable rf-channel

To associate an RF channel on the Cisco Wideband SPA with a wideband interface and allocate bandwidth, use the **cable rf-channel** command in interface configuration mode. To remove an association of an RF channel to a wideband interface, use the **no** form of this command.

**cable rf-channel** {*rf-port* | **controller** *controller-num* **channel** *channel-num*} [**bandwidth-percent** *bw-percent*] [**remaining ratio** *excess-value*]

**no cable rf-channel** {*rf-port* | **controller** *controller-num* **channel** *channel-num*}

|                           |                                            |                                                                                                                                                                                                                                                          |
|---------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>rf-port</i>                             | Specifies the RF channel physical port on the Wideband SPA field-programmable gate array (FPGA).                                                                                                                                                         |
|                           | <b>Note</b>                                | Valid values for the RF <i>port</i> depend on the configuration set with the <b>annex modulation</b> command (see the “Usage Guidelines” section).                                                                                                       |
|                           | <b>controller</b> <i>controller-num</i>    | Specifies the controller associated with the RF channel. The valid range is from 0 to 4.<br><br>Effective with Cisco IOS Release 12.2(33)SCH for Bonding Across 3G60 Controllers Support feature, valid range is from 0 to 2.                            |
|                           | <b>channel</b> <i>channel-num</i>          | Specifies the channel from the controller. The valid range is from 0 to 3.<br><br>Effective with Cisco IOS Release 12.2(33)SCH for Bonding Across 3G60 Controllers Support feature, valid range is from 0 to 23.                                         |
|                           | <b>bandwidth-percent</b> <i>bw-percent</i> | (Optional) Specifies the percent of bandwidth from this RF channel that will be used for the wideband interface. The range is 0 to 100. If <b>bandwidth-percent</b> is not used, the default bandwidth value is 100 percent.                             |
|                           | <b>remaining ratio</b> <i>excess-value</i> | (Optional) Specifies the ratio of the excess bandwidth that can be allocated to the wideband interface. The default value is 1. The range is 1 to 100.<br><br><b>Note</b> This option is only available when dynamic bandwidth sharing (DBS) is enabled. |

|                        |                                                                                                                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | No default RF channel association with a wideband interface is configured. If the <b>cable rf-channel</b> command is used without specifying <b>bandwidth-percent</b> , the default bandwidth value is 100 percent. |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

|                        |                |                                                                    |
|------------------------|----------------|--------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                |
|                        | 12.3(21)BC     | This command was introduced for the Cisco uBR10012 router.         |
|                        | 12.3(23)BC     | The <b>annex</b> and <b>modulation</b> keyword options were added. |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA.    |

|             |                                                                                                                              |
|-------------|------------------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC1 | The <b>remaining ratio</b> option was added.                                                                                 |
| 12.2(33)SCB | The <b>remaining ratio</b> option was integrated into Cisco IOS Release 12.2(33)SCB.                                         |
| 12.2(33)SCH | The <b>controller</b> option is supported for the Cisco uBR-MC3GX60V cable interface line card on the Cisco uBR10012 router. |

### Usage Guidelines

The **cable rf-channel** command associates an RF channel (port) on a Wideband SPA with a wideband interface. Optionally, you can specify the percent of bandwidth from this RF channel that will be used for the specified wideband interface.

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command. For annex A and 256 QAM modulation, each Wideband SPA supports up to 18 RF channels at full rate and up to 24 RF channels at less than full rate. For all other cases, the SPA supports 24 RF channels.



#### Note

The command changes in Cisco IOS releases 12.3(23)BC and 12.3(23)BC1 are not supported in Cisco IOS release 12.2(33)SCA.



#### Note

In Cisco IOS Releases 12.3(21)BC and 12.3(21a)BC3, the **cable rf-channel** command is not available on the Cisco IOS command line until annex and modulation have been set with **annex modulation** command.

Effective with Cisco IOS Release 12.3(23)BC, the **annex modulation** command is obsolete and **annex** and **modulation** are included as keyword options in the **rf-channel frequency** command.

Each Wideband SPA supports up to 32 wideband channels. A wideband interface cannot consist of RF channels from two different Wideband SPAs. The number of RF channels that can be aggregated into a wideband interface is determined by the capability of the wideband cable modem.

- The Linksys WCM300-NA, WCM300-EURO, and WCM300 JP wideband cable modems can receive a wideband interface consisting of up to eight downstream RF channels at 6 MHz per channel, or up to six downstream RF channels at 8 MHz per channel. The modem requires that the channels be received in a 50-MHz capture window.
- The Scientific Atlanta DPC2505 and EPC2505 wideband cable modems support the receiving of one wideband interface. The wideband channel consists of three downstream RF channels at either 6 MHz per channel or 8 MHz per channel.

An RF channel can be associated with multiple wideband interfaces as long as the wideband interfaces belong to the same virtual bundle interface (cable bundle) and the RF channel's total allocated bandwidth does not exceed 100 percent. As an example, [Table 14](#) shows that a single RF channel can be associated with multiple wideband interfaces as long as the total allocated bandwidth for the RF channel does not exceed 100 percent.

**Table 14 RF Channel Bandwidth Allocation**

| RF Channel | Wideband Interface | Bandwidth Allocated |
|------------|--------------------|---------------------|
| 10         | 0                  | 30 percent          |
| 10         | 1                  | 30 percent          |

**Table 14** RF Channel Bandwidth Allocation

| RF Channel                           | Wideband Interface | Bandwidth Allocated |
|--------------------------------------|--------------------|---------------------|
| 10                                   | 2                  | 40 percent          |
| Total Bandwidth Percent: 100 percent |                    |                     |

Table 15 shows that a single RF channel can be associated with a narrowband and multiple wideband interfaces as long as the total allocated bandwidth for the RF channel does not exceed 100 percent.

**Table 15** Bandwidth Allocation Using a Primary-Capable RF Channel

|                                               | Modular Cable Interface                                     | Wideband Channel 0 | Wideband Channel 1 | Wideband Channel 2 | Total Bandwidth Percent |
|-----------------------------------------------|-------------------------------------------------------------|--------------------|--------------------|--------------------|-------------------------|
| <b>Bandwidth Allocated from RF Channel 10</b> | 54 percent (4 percent used internally for DOCSIS signaling) | 10 percent         | 22 percent         | 14 percent         | 100 percent             |

**Note**

Each RF channel on the CMTS can be mapped to a specific QAM port on an edge QAM device. Traffic from different Wideband SPAs cannot be mixed on the same QAM port.

When dynamic bandwidth sharing (DBS) is enabled, the bandwidth percentage is converted to a committed information rate (CIR) value that provides the level of guaranteed bandwidth for the wideband interface. The reserved bandwidth for the wideband interface is the sum of its link queue CIR values and is used for admission control of the service flows with minimal reserved rate. With DBS enabled and the **cable rf-channel** command configured, the corresponding link queue can have 100 percent of the CIR value. The *excess-value* is the percent of excess bandwidth that can be allocated to the wideband channel.

Static bandwidth sharing (the default) or DBS can be configured on a wideband interface, but you cannot have both on the same interface.

**Examples**

The following example shows how to associate RF channel 10 and RF channel 11 with wideband interface 0:

```
Router(config)# interface wideband-cable 1/0/0:0
Router(config-if)# cable rf-channel 10 bandwidth-percent 50
Router(config-if)# cable rf-channel 11
```

The following example shows how to associate a controller to the RF channel for a wideband interface:

```
Router(config)# interface wideband-Cable 7/1/0:0
Router(config-if)# cable rf-channel controller 0 channel 1
```

In the preceding example, because no **bandwidth-percent** is specified in the second **cable rf-channel** command, the default value (100 percent of bandwidth) applies; that is, 100 percent of RF channel 11 bandwidth is used for wideband interface 0.

The following example shows bandwidth allocation when DBS is enabled:

```
Router(config)# interface wideband-cable 1/0/0:0
Router(config-if)# shutdown
Router(config-if)# cable dynamic-bw-sharing
Router(config-if)# no shutdown
Router(config-if)# cable rf-channel 10 bandwidth-percent 50 remaining ratio 5
```

In the preceding example, because DBS is enabled, the wideband interface is guaranteed 50 percent of the bandwidth and 5 as the value for allocating excess bandwidth.

The following example shows how the Bonding Groups Across 3G60 Controllers feature is configured:

```
Router(config-if)#interface wideband-cable 7/0/1:30
Router(config-if)#cable rf-channel controller 1 channel 21 bandwidth-percent 10
Router(config-if)#cable rf-channel controller 1 channel 22 bandwidth-percent 10
Router(config-if)#cable rf-channel controller 1 channel 23 bandwidth-percent 10
Router(config-if)#cable rf-channel controller 0 channel 21 bandwidth-percent 10
Router(config-if)#cable rf-channel controller 0 channel 22 bandwidth-percent 10
Router(config-if)#cable rf-channel controller 0 channel 23 bandwidth-percent 10
Router(config-if)#cable rf-channel 18 bandwidth-percent 10
Router(config-if)#cable rf-channel 19 bandwidth-percent 10
Router(config-if)#end
```

#### Related Commands

| Command                                           | Description                                                                                                    |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>annex modulation</b>                           | Sets the annex and modulation for the Wideband SPA.                                                            |
| <b>cable bonding-group-id</b>                     | Specifies a Bonding Group ID and indicates whether the bonding group is a primary or secondary bonded channel. |
| <b>cable dynamic-bw-sharing</b>                   | Enables dynamic bandwidth sharing on a specific modular cable or wideband cable interface.                     |
| <b>controller modular-cable</b>                   | Enters controller configuration mode to configure the Wideband SPA controller.                                 |
| <b>downstream cable</b>                           | Assigns a primary downstream channel for a fiber node.                                                         |
| <b>ip-address (controller)</b>                    | Sets the IP address of the Wideband SPA FPGA.                                                                  |
| <b>modular-host subslot</b>                       | Specifies the modular-host line card for Wideband protocol operations.                                         |
| <b>rf-channel cable downstream channel-id</b>     | Assigns a downstream channel ID to an RF channel.                                                              |
| <b>rf-channel description</b>                     | Specifies the description for each RF channel.                                                                 |
| <b>rf-channel frequency</b>                       | Sets the frequency for each RF channel.                                                                        |
| <b>rf-channel ip-address mac-address udp-port</b> | Sets the IP address, MAC address and UDP port for each RF channel.                                             |
| <b>rf-channel network delay</b>                   | Specifies the CIN delay for each RF channel.                                                                   |
| <b>upstream cable connector</b>                   | Specifies the upstream channel ports for a fiber node.                                                         |

# cable rfswitch copy

To copy an image from the Cisco CMTS router to the Cisco NGRFSW-ADV or from Cisco NGRFSW-ADV to the Cisco CMTS, use the **cable rfswitch copy** command in privileged EXEC mode.

```
cable rfswitch copy filename_cmts { to-rfsw | from-rfsw } filename_rfsw
```

| Syntax Description | <i>filename_cmts</i> | Filename of the image on or copied to the Cisco CMTS router.        |
|--------------------|----------------------|---------------------------------------------------------------------|
|                    | <b>to-rfsw</b>       | Copies an image from the Cisco CMTS router to the Cisco NGRFSW-ADV. |
|                    | <b>from-rfsw</b>     | Copies an image from the Cisco NGRFSW-ADV to the Cisco CMTS router. |
|                    | <i>filename_rfsw</i> | Filename of the image on or copied to the Cisco NGRFSW-ADV.         |

| Command Default | None |
|-----------------|------|
|-----------------|------|

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

| Usage Guidelines | Use the <b>cable rfswitch copy</b> command when an existing image on the Cisco NGRFSW-ADV or Cisco CMTS router is corrupt or out-of-date and needs to be replaced with another image. |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Examples | The following example shows how to download the gcv2.11 image from the Cisco CMTS router to the Cisco NGRFSW-ADV: |
|----------|-------------------------------------------------------------------------------------------------------------------|
|----------|-------------------------------------------------------------------------------------------------------------------|

```
Router> enable
Router# cable rfswitch copy disk0:gcv2.11 to-rfsw gcv2.11
```

The following example shows how to upload the gcv2.11 image from the Cisco NGRFSW-ADV to the Cisco uBR10012 CMTS:

```
Router> enable
Router# cable rfswitch copy disk0:gcv2.11 from-rfsw gcv2.11
```

| Related Commands | Command                                         | Description                                         |
|------------------|-------------------------------------------------|-----------------------------------------------------|
|                  | <b>show hccp</b><br><b>channel-switch state</b> | Displays the current state of the Cisco NGRFSW-ADV. |

# cable rfswitch delete

To delete an image in the Cisco NGRFSW-ADV, use the **cable rfswitch delete** command in privileged EXEC mode.

**cable rfswitch delete** *filename\_rfsw*

|                           |                      |                                                                         |
|---------------------------|----------------------|-------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>filename_rfsw</i> | Filename of the image on the Cisco NGRFSW-ADV that needs to be deleted. |
|---------------------------|----------------------|-------------------------------------------------------------------------|

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCG    | This command was introduced. |

|                         |                                                                                                                                                                                                                                            |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Use the <b>cable rfswitch delete</b> command when an existing image on the Cisco NGRFSW-ADV is corrupt, out-of-date, or needs to be replaced with another image. You cannot delete the active or the golden image on the Cisco NGRFSW-ADV. |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                      |
|-----------------|--------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to delete the gcv2.11 image on the Cisco NGRFSW-ADV: |
|-----------------|--------------------------------------------------------------------------------------|

```
Router> enable
Router# cable rfswitch delete gcv2.11
```

|                            |                                                                                                                                                                                              |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Associated Features</b> | The <b>cable rfswitch delete</b> command is used to configure the Cisco uBR Advanced RF Switch (NGRFSW-ADV). See <a href="#">Cisco uBR Advanced RF Switch Software Configuration Guide</a> . |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Related Commands</b> | <b>Command</b>                        | <b>Description</b>                                  |
|-------------------------|---------------------------------------|-----------------------------------------------------|
|                         | <b>show hccp channel-switch image</b> | Displays the image list on the Cisco NGRFSW-ADV.    |
|                         | <b>show hccp channel-switch state</b> | Displays the current state of the Cisco NGRFSW-ADV. |

# cable rfswitch reboot

To reboot the Cisco NGRFSW-ADV, use the **cable rfswitch reboot** command in privileged EXEC mode.

## cable rfswitch reboot

|                            |                                                                                                                                                                                              |                                                     |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>Syntax Description</b>  | <b>reboot</b>                                                                                                                                                                                | Reboots the Cisco NGRFSW-ADV.                       |
| <b>Command Default</b>     | None                                                                                                                                                                                         |                                                     |
| <b>Command Modes</b>       | Privileged EXEC (#)                                                                                                                                                                          |                                                     |
| <b>Command History</b>     | <b>Release</b>                                                                                                                                                                               | <b>Modification</b>                                 |
|                            | 12.2(33)SCG                                                                                                                                                                                  | This command was introduced.                        |
| <b>Examples</b>            | The following example shows how to reboot the Cisco NGRFSW-ADV:<br><br>Router> <b>enable</b><br>Router# <b>cable rfswitch reboot</b>                                                         |                                                     |
| <b>Associated Features</b> | The <b>cable rfswitch reboot</b> command is used to configure the Cisco uBR Advanced RF Switch (NGRFSW-ADV). See <a href="#">Cisco uBR Advanced RF Switch Software Configuration Guide</a> . |                                                     |
| <b>Related Commands</b>    | <b>Command</b>                                                                                                                                                                               | <b>Description</b>                                  |
|                            | <b>show hccp channel-switch image</b>                                                                                                                                                        | Displays the image list on the Cisco NGRFSW-ADV.    |
|                            | <b>show hccp channel-switch state</b>                                                                                                                                                        | Displays the current state of the Cisco NGRFSW-ADV. |

# cable rfswitch set-active

To set an image as active on the Cisco NGRFSW-ADV, use the **cable rfswitch set-active** command in privileged EXEC mode.

**cable rfswitch set-active** *filename\_rfsw*

| Syntax Description | <i>filename_rfsw</i> | Filename of the image on the Cisco NGRFSW-ADV that needs to be set as active. |
|--------------------|----------------------|-------------------------------------------------------------------------------|
|--------------------|----------------------|-------------------------------------------------------------------------------|

| Command Default | None |
|-----------------|------|
|-----------------|------|

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

**Examples** The following example shows how to set the gcv2.11 image as active on the Cisco NGRFSW-ADV:

```
Router> enable
Router# cable rfswitch set-active gcv2.11
Router# cable rfswitch reboot
```

**Associated Features** The **cable rfswitch set-active** command is used to configure the Cisco uBR Advanced RF Switch (NGRFSW-ADV). See [Cisco uBR Advanced RF Switch Software Configuration Guide](#).

| Related Commands | Command                               | Description                                         |
|------------------|---------------------------------------|-----------------------------------------------------|
|                  | <b>show hccp channel-switch image</b> | Displays the image list on the Cisco NGRFSW-ADV.    |
|                  | <b>show hccp channel-switch state</b> | Displays the current state of the Cisco NGRFSW-ADV. |



# cable rsvp default-scn

To specify the default service class that enables the Resource ReSerVation Protocol (RSVP) created service flows to inherit characteristics , use the **cable rsvp default-scn** command in global configuration mode.

**cable rsvp default-scn** *service-class name*

|                           |                                                                           |
|---------------------------|---------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>service-class name</i> The name of a downstream DOCSIS service-class . |
|---------------------------|---------------------------------------------------------------------------|

|                        |                                  |
|------------------------|----------------------------------|
| <b>Command Default</b> | Service class is not configured. |
|------------------------|----------------------------------|

|                      |                           |
|----------------------|---------------------------|
| <b>Command Modes</b> | Global configuration mode |
|----------------------|---------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

|                         |                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>cable rsvp default-scn</b> command allows users to specify the default service class that enables the RSVP created service flows to inherit characteristics. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                |
|-----------------|----------------------------------------------------------------|
| <b>Examples</b> | The following example configures a default RSVP service class. |
|-----------------|----------------------------------------------------------------|

```
Router#configure terminal
Router(config)# cable service class 220 name RSVPClass
Router(config)#cable service class 220 downstream
Router(config)#cable service class 220 max-latency 100000
Router(config)#cable service class 220 req-attr-mask ffff0000
Router(config)#cable rsvp default-scn RSVPClass
Router(config)#cable rsvp default-scn RSVPClass
```

| Related Commands | Command                        | Description                                                                |
|------------------|--------------------------------|----------------------------------------------------------------------------|
|                  | <b>show cable rsvp flow-db</b> | Displays the contents of the RSVP to DOCSIS service-flow mapping database. |

# cable rf-change-trigger

To specify the amount of time an event must persist before it triggers an action for the reporting cable modem, use the **cable rf-change-trigger** command in global configuration mode. To restore the default value, use the **no** form of this command.

**cable rf-change-trigger** {percent *value* | count *number*} [**secondary**]

**no cable rf-change-trigger** {percent *value* | count *number*} [**secondary**]

## Syntax Description

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>percent</b> <i>value</i>                                 | Indicates the percentage of cable modems that must report that a particular non-primary RF channel is down before that channel is removed from the bonding group. The valid range is 1 to 100. The default value is 0.                                                                                                                                                                                                                 |
| <b>count</b> <i>number</i>                                  | Specifies the number of cable modems reporting an impairment for a non-primary downstream channel. The default value is 0.                                                                                                                                                                                                                                                                                                             |
| <b>secondary</b>                                            | (Optional) Configures the Cisco CMTS to move the unicast secondary service flows to the primary channel interface, when the number of cable modems reporting RF channel impairment is less than the configured (percent or count) threshold.<br><br><div> <b>Note</b> Only those unicast secondary service flows, which share the same wideband interface as the primary interface, are moved to the primary channel interface. </div> |
| By default, the <b>secondary</b> keyword is not configured. |                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Command Default

If this command is not used, the default value (0) is used.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                                                                                                                                                                                         |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCB  | This command was introduced.                                                                                                                                                                                                         |
| 12.2(33)SCE4 | This command was modified. A new keyword <b>secondary</b> was added to move the unicast secondary SFs, which share the same interface as the primary SF, to the primary channel interface when the trigger threshold is not reached. |

## Usage Guidelines

This command applies to all non-primary RF channels on a Cisco CMTS router. The default value of 0 prevents any bonding group modifications. In order to dampen the change of a logical state of an RF channel, the trigger for the channel can be set to one half of the number used for the logical state. For example, if you enter **cable rf-change-trigger percent 20**, when 20 percent of the cable modems report an RF channel is down, the logical state of the RF channel is changed to down. And when 10 percent of the cable modems report that the affected RF channel is back, the logical state is changed to up.

In the case of a small number of wideband modems, you can specify an absolute value for triggering an event in addition to the percentage. Both values must be true in order to trigger the suspension of an RF channel. When both values are 0, the cable modem is reset if the cable modem reports an RF failure through a status message. Also, if you set thresholds to 0, then all cable modems with RF failures are reset and any RFs suspended from a bonding group are reactivated.

### Examples

The following example shows how to specify the amount of time an event must persist before it triggers an action for the reporting cable modem:

```
Router# configure terminal
Router(config)# cable rf-change-trigger percent 50 count 1
```

The following example shows how to configure the Cisco CMTS to move secondary SFs to primary interface when the trigger threshold is not reached, in Cisco IOS Release 12.2(33)SCE4:

```
Router# configure terminal
Router(config)# cable rf-change-trigger percent 50 count 1 secondary
```

### Associated Features

The **cable rf-change-trigger** command is used to configure the following features:

- [Wideband Modem Resiliency](#)

### Related Commands

| Command                                | Description                                                              |
|----------------------------------------|--------------------------------------------------------------------------|
| <b>cable<br/>rf-change-dampen-time</b> | Specifies the amount of time an RF channel must remain in its new state. |





## Cable Commands: cable s

Revised: August 12, 2013, OL-15510-17

### New Commands

| Command                                                                       | Cisco IOS Software Release |
|-------------------------------------------------------------------------------|----------------------------|
| <b>cable service attribute ds-bonded downstream-type bonding-enabled</b>      | 12.3(23)BC                 |
| <b>cable service attribute non-ds-bonded downstream-type bonding-disabled</b> | 12.3(23)BC                 |
| <b>cable service attribute non-ds-bonded legacy-ranging downstream-type</b>   | 12.3(23)BC                 |
| <b>cable service attribute voice-enabled</b>                                  | 12.3(23)BC                 |
| <b>cable service type</b>                                                     | 12.2(33)SCB                |
| <b>cable submgmt default</b>                                                  | 12.2(33)SCB                |
| <b>cable set mpls-experimental value</b>                                      | 12.2(33)SCC                |
| <b>cable sid-cluster-group</b>                                                | 12.2(33)SCC                |
| <b>cable sid-cluster-switching</b>                                            | 12.2(33)SCC                |
| <b>cable service attribute withhold-TLVs</b>                                  | 12.2(33)SCB10              |
| <b>cable source-verify enable-sav-static</b>                                  | 12.2(33)SCC                |
| <b>cable source-verify group</b>                                              | 12.2(33)SCC                |
| <b>cable source-route</b>                                                     | 12.2(33)SCF                |

### Modified Commands

| Command                    | Cisco IOS Software Release |
|----------------------------|----------------------------|
| <b>cable service class</b> | 12.2(33)SCB                |
| <b>cable service class</b> | 12.2(33)SCB1               |
| <b>cable service class</b> | 12.2(33)SCF2               |

**Obsolete Commands**

| Command                                  | Cisco IOS Software Release |
|------------------------------------------|----------------------------|
| <code>cable spectrum-group shared</code> | 12.2(33)SCG                |

# cable service attribute ds-bonded downstream-type bonding-enabled

To force a downstream bonding-capable modem to initialize on a bonded primary-capable downstream channel, use the **cable service attribute ds-bonded downstream type bonding-enabled** command in global configuration mode. To restore default configuration, use the **no** form of the command.

**cable service attribute ds-bonded downstream-type bonding-enabled [enforce]**

**no cable service attribute ds-bonded downstream-type bonding-enabled**

|                           |                |                                                                         |
|---------------------------|----------------|-------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>enforce</b> | Enforces bonding-capable modems to register only on bonded RF channels. |
|---------------------------|----------------|-------------------------------------------------------------------------|

|                        |                                                                                                                                                                |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | A bonding-capable modem is allowed to register on the primary channel selected by the modem for initiation even if the channel is not part of a bonding group. |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

|                        |                |                                                      |
|------------------------|----------------|------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                  |
|                        | 12.3(23)BC     | This command was introduced for the uBR10012 router. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>For bonding capable cable modems, the primary channel selection that is done by the CMTS depends on whether the modems can resolve its MAC Domain Downstream Service Group ID (MD-DS-SG). The CM must attempt to determine its MAC Domain Downstream Service Group ID (MD-DS-SG-ID) if an MDD is present on the downstream. If a modem has resolved its MD-DS-SG, the CMTS selects a bonded primary channel, the primary channel that is part of an operational wideband channel, from the RF channel set corresponding to the MD-DS-SG determined by the modem. The bonded primary channel selected by the CMTS needs to be hosted by an interface on the same uBR10-MC5X20 cable interface line card as the modem's initial primary channel. If there are multiple primary capable channels that meet the above criteria, the final primary channel will be randomly selected among the eligible channel set.</p> |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

When the CMTS has an existing record of a CM (listed in the **show cable modem** command output) that should be moved to a bonded channel, a Dynamic Frequency Override (DFO) is triggered to be sent in the RNG-RSP from the CMTS to that CM.

If a CM is ranging for the first time (not listed in the **show cable modem** command output), no DFO is triggered at initial-ranging time. The CM proceeds to register and the CMTS gleans the bonding capabilities of the CM to determine if it should be moved to a bonded channel. If the CM is on a wrong primary DS channel, the DOCSIS specification does not allow a DFO at this time, so the CMTS rejects the registration of the CM forcing it to enter the reject(c) state. The CMTS then waits for the CM to start ranging again. If the CM engages with the same incorrect DS channel, the CMTS triggers a DFO to the CM during initial-ranging because it now has a record of that CM.

If a modem has not resolved its MD-DS-SG and the enforce option is configured, the CMTS selects a bonded primary channel based on MAP group associated with the modem’s upstream channel. Typically, an upstream channel is configured into a single fiber node and the CMTS infers the topology information based on the downstream channels associated with the upstream. If the enforce option is not configured or the CMTS cannot find a target primary channel, the modem will be allowed to register on the primary channel currently selected by the modem for initialization.



**Note**

The CMTS will only try to move the modem with MD-DS-SG unresolved if the **enforce** option is configured.

By default, changing the primary channel to select a wideband channel is not enforced and modems are allowed to operate on a primary channel even if they are not included in any load balancing groups. At any time after the system is up, enabling the primary channel selection for bonding capable modems will not affect existing modems in the system. The operator has to manually reset the bonding capable modems using the **clear cable modem** command either globally or at per-MAC Domain level.



**Note**

Enabling primary channel selection for wideband modems will not affect existing modems in the system.

**Examples**

```
Router# configure terminal
Router(config)# cable service attribute ds-bonded downstream-type bonding-enabled [enforce]
```

**Related Commands**

|                                                                               |                                                                                               |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>cable dfo-retry-count</b>                                                  | Configures the Downstream Frequency Override (DFO) retry count.                               |
| <b>cable service attribute non-ds-bonded downstream-type bonding-disabled</b> | Forces the non-bonding-capable modems to register only on non-bonded RF channels on the CMTS. |
| <b>cable service attribute voice-enabled</b>                                  | Restricts voice services to only to the uBR10-MC5x20 line cards for high availability.        |



# cable service attribute non-ds-bonded downstream-type bonding-disabled

To force the non-bonding-capable modems to register only on non-bonded RF channels on the CMTS, use the **cable service attribute non-ds-bonded downstream-type bonding-disabled** command in global configuration mode. To restore default behavior, use the **no** form of the command.

**cable service attribute non-ds-bonded downstream-type bonding-disabled**

## Syntax Description

This command has no keywords or arguments.

## Command Default

The non-bonding-capable modem registers on its current primary channel.

## Command Modes

Global configuration

## Command History

| Release    | Modification                                               |
|------------|------------------------------------------------------------|
| 12.3(23)BC | This command was introduced for the Cisco uBR10012 router. |

## Usage Guidelines

A modem is identified as a non-bonding-capable modem if the modem reports a Multiple Receive Channel Support value of 1 for TLV 5.29 or an RCP ID unknown to the CMTS during the modem's registration request.

The non-bonding capable modem, identified at registration, will be moved to a non-bonded primary channel through downstream frequency override, if its current primary channel is part of a bonding group. The target non-bonded primary channel will be selected among primary capable channels that are associated to the modem's current upstream channel, however not included in any wideband channels associated to any host interfaces on the local line card. Once this option is enabled, the bonded primary channels will be taken out of load balancing group, to prevent non-bonding capable modems to be moved back to bonded primary channels for load balancing purpose.



### Note

Enabling primary channel selection for wideband modems will not affect existing modems in the system. The operator has to reset the existing non-bonding capable modems using the **clear cable modem** command.

## Examples

```
Router# configure terminal
Router(config)# cable service attribute non-ds-bonded downstream-type bonding disabled
```

|                         |                                                                           |                                                                                                         |
|-------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>cable dfo-retry-count</b>                                              | Configures the Downstream Frequency Override (DFO) retry count.                                         |
|                         | <b>cable service attribute ds-bonded downstream-type bonding-disabled</b> | Forces a downstream bonding-capable modem to initialize on a bonded primary-capable downstream channel. |
|                         | <b>cable service attribute voice-enabled</b>                              | Restricts voice services to only to the uBR10-MC5x20 line cards for high availability.                  |
|                         | <b>clear cable modem</b>                                                  | Removes all modems or modems hosted by a uBR10-MC5x20 downstream interface under a specific category.   |

# cable service attribute non-ds-bonded legacy-ranging downstream-type

To redirect potential non-bonding-capable modems that access the CMTS with INIT-RNG\_REQ at initialization to a specified downstream channel frequency, use the **cable service attribute non-ds-bonded legacy-ranging downstream-type command** in global configuration mode. To restore default behavior, use the **no** form of the command.

**cable service attribute non-ds-bonded legacy-ranging downstream-type frequency** *freq*

**no cable service attribute legacy-ranging downstream-type**

## Syntax Description

|                              |                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>frequency</b> <i>freq</i> | Specifies the downstream channel frequency to which modems that access the CMTS with legacy INIT-RNG-REQ are moved. |
|------------------------------|---------------------------------------------------------------------------------------------------------------------|

## Command Default

The non-bonding-capable modem continues the ranging process on the primary channel currently selected by the modem for initialization.

## Command Modes

Global configuration

## Command History

| Release    | Modification                                         |
|------------|------------------------------------------------------|
| 12.3(23)BC | This command was introduced for the uBR10012 router. |

## Usage Guidelines

The **cable service attribute non-ds-bonded** command provides the ability to prevent potential non-bonding-capable modems that access CMTS with legacy INIT-RNG-REQ at initialization to register on a CMTS that supports bonding-capable modem. These modems that use legacy initial ranging will be redirected to a specified downstream channel frequency.



### Note

If the frequency option is used and if the frequency is modified, then the new frequency setting will only impact new modems trying to initialize after the frequency is modified. To enforce the downstream channel selection policy on existing modems, each modem has to be manually reset either globally or at the individual primary channel level using the **clear cable modem** command.

## Examples

```
Router# configure terminal
Router(config)# cable service attribute non-ds-bonded legacy-ranging downstream-type frequency
55000000
```

|                         |                                                                               |                                                                                                                 |
|-------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>cable service attribute voice-enabled</b>                                  | <b>Restricts voice services only to the uBR10-MC5x20 line cards for high availability.</b>                      |
|                         | <b>cable service attribute ds-bonded downstream-type bonding-enabled</b>      | Forces a downstream-bonding capable modem to initialize on a bonded primary-capable downstream channel.         |
|                         | <b>cable service attribute non-ds-bonded downstream-type bonding-disabled</b> | Forces the non-bonding-capable modems to register only on non-bonded RF channels on the CMTS.                   |
|                         | clear cable modem                                                             | Removes all modems or modems hosted by a uBR10-MC5x20 line card downstream interface under a specific category. |

# cable service attribute voice-enabled

To restrict voice services only to the uBR10-MC5X20 downstream interfaces for high availability, use the **cable service attribute voice-enabled** command in global configuration mode. To remove the restriction of voice services to the uBR10-MC5X20 downstream interfaces, use the **no** form of the command.

**cable service attribute voice-enabled downstream-type HA-capable**

**no cable service attribute voice-enabled downstream-type HA-capable**

|                           |                        |                                                          |
|---------------------------|------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | <b>downstream-type</b> | Restricts voice services to a specific downstream type.  |
|                           | <b>HA-capable</b>      | Restricts voice services to the uBR10-MC 5x20 line card. |

|                        |                                                                                                                                |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | All primary-capable downstream channels on the uBR10-MC 5x20 line card and the SPA can support downstream voice service flows. |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                        |
|------------------------|----------------|------------------------------------------------------------|
|                        | 12.3(23)BC     | This command was introduced for the Cisco uBR10012 router. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>A voice-enabled cable modem is identified either at registration by decoding DHCP TLV 122 in the modem's DHCP-ACK, or at its first voice call if DHCP TLV 122 is not exchanged. If a voice-enabled modem is detected at registration on a SPA downstream channel, it will be moved to the uBR10-MC5x20 downstream channel in the CGD <i>via</i> downstream frequency override. If the voice-enabled modem is detected at its first voice call after registration, it will be moved after the call is over to the uBR10-MC5x20 channel in the CGD <i>via</i> DCC. If the voice enabled modem fails to come up on the target uBR10-MC5x20 channel, the CMTS will continue to move the modem until three retries (the maximum number of allowed retries) has been reached, when the modem will be allowed to stay on the SPA downstream channel until another set of retries is attempted by the CMTS every 24 hours. A voice enabled modem on the uBR10-MC5x20 channel will be excluded from being load balanced to a SPA downstream channel. If this option is configured at any time after the system is up, voice enabled modems that have been identified on the SPA downstream channel without active voice calls will be gradually moved to the uBR10-MC5x20 downstream channel in the CGD at the rate of one modem per five seconds.</p> |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| <b>Examples</b> | Router# <b>configure terminal</b>                                                       |
|                 | Router(config)# <b>cable service attribute voice-enabled downstream-type HA-capable</b> |

|                  |                                              |                                                                                                 |
|------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------|
| Related Commands | <b>cable service attribute non-ds-bonded</b> | Forces a non-bonding-capable modem to register only on non-bonded RF channels.                  |
|                  | <b>cable service attribute ds-bonded</b>     | Forces a downstream-bonding capable modem to initialize on a bonded primary-capable DS channel. |

# cable service attribute withhold-TLVs

To block sending of DOCSIS 3.0 time, length, value (TLVs) to DOCSIS 1.x and DOCSIS 2.0 cable modems, use the **cable service attribute withhold-TLVs** command in global configuration mode. To unblock sending of the DOCSIS 3.0 TLVs to DOCSIS 1.x and DOCSIS2.0 cable modems, use the **no** form of this command.

**cable service attribute withhold-TLVs peak-rate**

**no cable service attribute withhold-TLVs peak-rate**

| Syntax Description | <b>peak-rate</b> Specifies the DOCSIS 3.0 peak traffic rate TLVs 24.27 and 25.27, which are blocked from being sent to the non-DOCSIS 3.0 cable modems. |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|

| Command Default | The DOCSIS 3.0 TLVs are sent to all cable modems. |
|-----------------|---------------------------------------------------|
|-----------------|---------------------------------------------------|

| Command Modes | Global configuration (config) |
|---------------|-------------------------------|
|---------------|-------------------------------|

| Command History | Release       | Modification                                               |
|-----------------|---------------|------------------------------------------------------------|
|                 | 12.2(33)SCB10 | This command was introduced for the Cisco uBR10012 router. |

| Usage Guidelines | Some DOCSIS 1.x and DOCSIS 2.0 cable modems may fail to come online when they receive DOCSIS 3.0 TLVs from the CMTS during registration. The <b>cable service attribute withhold-TLVs</b> command allows you to restrict sending of the configured DOCSIS 3.0 TLVs to DOCSIS 1.x and DOCSIS 2.0 cable modems. This command does not restrict sending of DOCSIS 3.0 TLVs to DOCSIS 3.0 cable modems. |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



| Note | In Cisco IOS Release 12.2(33)SCB10 only the <b>peak-rate</b> keyword is supported, which represents TLVs 24.27 and 25.27. |
|------|---------------------------------------------------------------------------------------------------------------------------|
|------|---------------------------------------------------------------------------------------------------------------------------|

| Examples | The following example shows how to configure the CMTS to restrict sending of DOCSIS 3.0 peak traffic rate TLVs 24.27 and 25.27 to non-DOCSIS 3.0 cable modems: |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router # configure terminal
Router(config)# cable service attribute withhold-TLVs peak-rate
```

The following warning message is displayed when the above example is configured.

Warning: This configuration may violate D3.0 MULPI specification per section 6.4.8.

| Related Commands | Command             | Description                          |
|------------------|---------------------|--------------------------------------|
|                  | cable service class | Defines and modifies a service class |



# cable service class

To set parameters for DOCSIS 1.1 cable service class, use the **cable service class** command in global configuration mode. To delete a service class or to remove a configuration, use the **no** form of the command.

**cable service class** *class-index* [*keyword-options*]

**no cable service class** *class-index* [*keyword-options*]

## Syntax Description

|                            |                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>class-index</i>         | Specifies the class ID for the class to be modified. Valid range is 1 to 255.                                                                                                                                                                                                                                                                                                             |
| <b>activity-timeout</b>    | Specifies the activity timeout (0 to 65,535).                                                                                                                                                                                                                                                                                                                                             |
| <b>admission-timeout</b>   | Specifies the admitted timeout (0 to 65,535).                                                                                                                                                                                                                                                                                                                                             |
| <b>downstream</b>          | Specifies that the service class is for the downstream direction (from the CMTS to the CM). (The default direction is <b>upstream</b> .)                                                                                                                                                                                                                                                  |
| <b>grant-interval</b>      | Specifies the grant interval (0 to 4,294,967,295 microseconds).                                                                                                                                                                                                                                                                                                                           |
| <b>grant-jitter</b>        | Specifies the grant jitter (0 to 4,294,967,295 microseconds).                                                                                                                                                                                                                                                                                                                             |
| <b>grant-size</b>          | Specifies the grant size (0 to 65,535 bytes).                                                                                                                                                                                                                                                                                                                                             |
| <b>grants-per-interval</b> | Specifies the grants per interval (0 to 127 grants).                                                                                                                                                                                                                                                                                                                                      |
| <b>max-burst</b>           | Specifies the maximum transmission burst (1522 to 4,294,967,295 bytes).<br><br><b>Note</b> The recommended value range is 1600 to 1800 bytes. Using a value of 0 or greater than 1800 bytes can cause latency issues for Voice-over-IP. A value of less than 1522 bytes can prevent the upstream transmission of large ethernet frames for any CM or CMTS not implementing fragmentation. |
| <b>max-buff-size</b>       | Specifies the maximum buffer size of the upstream service-flow queue (or buffer) on the CM. The valid range is from 0 to 4294967295 bytes. The default value is 0.                                                                                                                                                                                                                        |
| <b>max-concat-burst</b>    | Specifies the maximum concatenation burst (0 to 65,535 bytes).                                                                                                                                                                                                                                                                                                                            |
| <b>max-latency</b>         | Specifies the maximum latency allowed (0 to 4,294,967,295 microseconds).                                                                                                                                                                                                                                                                                                                  |
| <b>max-rate</b>            | Specifies the maximum rate (0 to 4,294,967,295 bps).                                                                                                                                                                                                                                                                                                                                      |
| <b>min-buff-size</b>       | Specifies the minimum buffer size of the upstream service-flow queue (or buffer) on the CM. The valid range is from 0 to 4294967295 bytes. The default value is 0.                                                                                                                                                                                                                        |
| <b>min-packet-size</b>     | Specifies the minimum packet size for reserved rate (0 to 65,535 bytes).                                                                                                                                                                                                                                                                                                                  |
| <b>min-rate</b>            | Specifies the minimum rate (0 to 4,294,967,295 bps).                                                                                                                                                                                                                                                                                                                                      |
| <b>name</b>                | Specifies the service class name string.                                                                                                                                                                                                                                                                                                                                                  |
| <b>peak-rate</b>           | Specifies the peak rate (0 to 4,294,967,295 bps). Default value is zero, which represents the line rate.<br><br><b>Note</b> The <i>peak-rate</i> option is not supported on the DOCSIS 1.0 modems.                                                                                                                                                                                        |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>poll-interval</b>                         | Specifies the poll interval (0 to 4,294,967,295 microseconds).                                                                                                                                                                                                                                                                                                                                                          |
| <b>poll-jitter</b>                           | Specifies the poll jitter (0 to 4,294,967,295 microseconds).                                                                                                                                                                                                                                                                                                                                                            |
| <b>priority</b>                              | Specifies the priority (0 to 7, where 7 is the highest priority).                                                                                                                                                                                                                                                                                                                                                       |
| <b>req-trans-policy</b>                      | Specifies the request transmission policy bit field (0 to FFFFFFFF in hexadecimal).                                                                                                                                                                                                                                                                                                                                     |
| <b>sched-type</b>                            | Specifies the service class schedule type: <ul style="list-style-type: none"> <li>2–Best-Effort Schedule Type</li> <li>3–Non-Real-Time Polling Service Schedule Type (supported only in Cisco 12.2(4)BC and later releases)</li> <li>4–Real-Time Polling Service Schedule Type</li> <li>5–Unsolicited Grant Service with Activity Detection Schedule Type</li> <li>6–Unsolicited Grant Service Schedule Type</li> </ul> |
| <b>tar-buff-size</b>                         | Specifies the target or desired size of the upstream service-flow queue (or buffer) on the CM. The valid range is from 0 to 4294967295 bytes. The default value is 0.                                                                                                                                                                                                                                                   |
| <b>tos-overwrite</b> <i>and-mask or-mask</i> | Overwrites the ToS byte by first ANDing the TOS value with the <i>and-mask</i> value and then ORing the result of that operation with the <i>or-mask</i> value. Both parameters must be specified in hexadecimal. The <i>and-mask</i> value can range from 0x0 to 0xFF and the <i>or-mask</i> value can range from 0x0 to 0xFF.                                                                                         |
| <b>upstream</b>                              | Specifies that the service class is for the upstream direction (from the CM to the CMTS). This is the default direction.                                                                                                                                                                                                                                                                                                |
| <i>n</i>                                     | Specifies the bundle identifier.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>req-attr-mask</b>                         | Specifies the required attribute mask bit field (0 to FFFFFFFF in hexadecimal).                                                                                                                                                                                                                                                                                                                                         |
| <b>forb-attr-mask</b>                        | Specifies the forbidden attribute mask bit field (0 to FFFFFFFF in hexadecimal).                                                                                                                                                                                                                                                                                                                                        |

**Command Default**

Values that are not specified are set to their DOCSIS 1.1 defaults, if applicable to the service-class schedule type. See Section C.2.2, *Service Flow Encodings*, in the DOCSIS 1.1 specification.

**Command Modes**

Global configuration (config)

**Command History**

| Release    | Modification                                                                                                                                                                  |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX  | This command was introduced for DOCSIS 1.1 operation. This command replaced the <b>cable qos profile</b> command that was used in previous versions for DOCSIS 1.0 operation. |
| 12.2(4)BC1 | This command was integrated into Cisco IOS release 12.2(4)BC1. This command was also enhanced to support NRTPS scheduling.                                                    |

| Release      | Modification                                                                                                                                                                                                                                                                                                                                                  |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(11)BC2  | The default value for the maximum transmission burst parameter (max-burst) was changed from 1522 bytes to 3044 bytes. The default value for the maximum concatenation burst parameter was also changed from 0 bytes (unlimited) to 1522 bytes. These changes are to accommodate the latest revision of the DOCSIS 1.1 specification (SP-RFI-v1.1-I09-020830). |
| 12.3BC       | This command was integrated into Cisco IOS release 12.3BC.                                                                                                                                                                                                                                                                                                    |
| 12.2(33)SCA  | This command was integrated into Cisco IOS release 12.2(33)SCA.                                                                                                                                                                                                                                                                                               |
| 12.2(33)SCB  | This command was modified with the addition of <b>req-attr-mask</b> and <b>forb-attr-mask</b> keywords.                                                                                                                                                                                                                                                       |
| 12.2(33)SCB1 | This command was modified with the addition of <i>peak-rate</i> to set value greater than the <i>max-rate</i> .                                                                                                                                                                                                                                               |
| 12.2(33)SCF2 | This command was modified. Three new keywords <b>max-buff-size</b> , <b>min-buff-size</b> , and <b>tar-buff-size</b> were added as part of the Upstream Buffer Control feature.                                                                                                                                                                               |

### Usage Guidelines

The **sched-type** option must always be specified for each class. When a certain scheduling type is selected, take care that the mandatory parameters for that scheduling type are explicitly entered, while nonapplicable parameters must be explicitly removed.

The default direction is **upstream**. We recommend that you do not change the direction of a service class after you have created it, because some of the existing service class parameters might not be appropriate for the new direction. Instead, delete the current service class and create a new service class with the correct upstream or downstream direction.

If the service class is newly created, a service-class name must be defined before entering the parameters for the service class.



#### Note

Section C.2.2.6.10, *IP Type of Service Overwrite*, of the DOCSIS 1.1 specification changed the operation of **tos-overwrite** option. In DOCSIS 1.1 networks, the new TOS value is calculated by the following formula: New IP TOS = ((Original TOS value AND *and-mask*) OR *or-mask*). (For a description of the previous method of calculating the TOS value, see the **cable qos profile** command.) The default is to leave the TOS value unchanged (no overwrite).

### Examples

The following examples show configurations that use the **cable service class** command to create service classes. Based on the scheduling type specified, some command lines are mandatory, while others are optional.

Each example shown here is a complete configuration set for creating a service class.

#### Configuring a Service Class for Unsolicited Grant Scheduling Service

```
Router(config)# cable service class 1 name UP_UGS
Router(config)# cable service class 1 sched-type 6
Router(config)# cable service class 1 grant-size 100
Router(config)# cable service class 1 grant-interval 20000
Router(config)# cable service class 1 grant-jitter 4000
Router(config)# cable service class 1 grants-per-interval 1
Router(config)# cable service class 1 min-packet-size 100
Router(config)# cable service class 1 req-trans-policy 0x1FF
Router(config)# cable service class 1 tos-overwrite 0x1F 0xE0
Router(config)# cable service class 1 activity-timeout 30
```

```
Router(config)# cable service class 1 admission-timeout 30
```

### Configuring a Service Class for Unsolicited Grant Scheduling with Activity Scheduling

```
Router(config)# cable service class 2 name UP_UGSAD
Router(config)# cable service class 2 sched-type 5
Router(config)# cable service class 2 grant-size 100
Router(config)# cable service class 2 grant-interval 20000
Router(config)# cable service class 2 grant-jitter 4000
Router(config)# cable service class 2 grants-per-interval 1
Router(config)# cable service class 2 poll-interval 10000
Router(config)# cable service class 2 poll-jitter 4000
Router(config)# cable service class 2 min-packet-size 100
Router(config)# cable service class 2 req-trans-policy 0x1FF
Router(config)# cable service class 2 tos-overwrite 0x1F 0xE0
Router(config)# cable service class 2 activity-timeout 30
Router(config)# cable service class 2 admission-timeout 30
```

### Configuring a Service Class with Real-Time Polling Service

```
Router(config)# cable service class 3 name UP_RTPS
Router(config)# cable service class 3 sched-type 4
Router(config)# cable service class 3 poll-interval 10000
Router(config)# cable service class 3 poll-jitter 4000
Router(config)# cable service class 3 min-rate 64000
Router(config)# cable service class 3 max-rate 128000
Router(config)# cable service class 3 max-burst 2000
Router(config)# cable service class 3 max-concat-burst 1522
Router(config)# cable service class 3 req-trans-policy 0x1FF
Router(config)# cable service class 3 tos-overwrite 0x1F 0xE0
Router(config)# cable service class 3 activity-timeout 30
Router(config)# cable service class 3 admission-timeout 30
```

### Configuring a Service Class for Best-Effort Upstream Service

```
Router(config)# cable service class 4 name UP_BE
Router(config)# cable service class 4 sched-type 2
Router(config)# cable service class 4 priority 5
Router(config)# cable service class 4 min-rate 0
Router(config)# cable service class 4 max-rate 128000
Router(config)# cable service class 4 max-burst 2000
Router(config)# cable service class 4 max-concat-burst 1522
Router(config)# cable service class 4 req-trans-policy 0x0
Router(config)# cable service class 4 tos-overwrite 0x1F 0xE0
Router(config)# cable service class 4 activity-timeout 30
Router(config)# cable service class 4 admission-timeout 30
```

### Configuring a Service Class for Best-Effort Downstream Service

```
Router(config)# cable service class 5 name DOWN_BE
Router(config)# cable service class 5 priority 5
Router(config)# cable service class 5 min-rate 0
Router(config)# cable service class 5 max-rate 1000000
Router(config)# cable service class 5 max-burst 3000
Router(config)# cable service class 5 activity-timeout 30
Router(config)# cable service class 5 admission-timeout 30
```

### Configuring a Service Class for Peak-Rate

```
Router(config)# cable service class 201 name hsd
Router(config)# cable service class 201 downstream
Router(config)# cable service class 201 max-rate 1024000
Router(config)# cable service class 201 min-rate 1024000
Router(config)# cable service class 201 peak-rate 2000000
```

**Configuring a Service Class with Upstream Buffer Control Parameters**

```
Router(config)# cable service class 10 name REG-US
Router(config)# cable service class 10 upstream
Router(config)# cable service class 10 max-buff-size 20000
Router(config)# cable service class 10 min-buff-size 10000
Router(config)# cable service class 10 tar-buff-size 15000
```

**Associated Features**

The **cable service class** command is used to configure the following features:

- [Configuring Upstream Cable Interface Features on the Cisco CMTS Routers](#)
- [Upstream Scheduler Mode for the Cisco CMTS Routers](#)

**Related Commands**

| Command                         | Description                                          |
|---------------------------------|------------------------------------------------------|
| <b>cable qos profile</b>        | Creates a DOCSIS 1.0 QoS profile.                    |
| <b>show cable service-class</b> | Displays the service classes that have been created. |

# cable service flow activity-timeout

To configure the activity timeout for dynamic cable service flows in DOCSIS 1.1 environments, where PacketCable is inactive, use the **cable service flow activity-timeout** command in global configuration mode. To remove the activity timer once configured, use the **no** form of this command.

**cable service flow activity-timeout** *n*

**no cable service flow activity-timeout** [*<n>*]

## Syntax Description

*n* The timeout length in seconds. Valid range is 0 - 65535 seconds. Setting this value to 0 configures the service flow to never timeout.

## Command Default

The default timeout length for a DOCSIS 1.0+ cable service flow is 300 seconds (five minutes).

## Command Modes

Global configuration

## Command History

| Release      | Modification                                                                                               |
|--------------|------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC2 | This command was introduced to support DOCSIS 1.1 service flow operation in non-Packet-Cable environments. |

## Usage Guidelines

Dynamic service flows in DOCSIS 1.0+ are created with a default activity timeout of 300 seconds. This enables the deletion of idle service flows after five minutes. This new command enables such functions within DOCSIS 1.1 environments with a wide range of timeout length options.

In DOCSIS 1.1, the default inactivity timeout is often set by the application that triggers the creation of dynamic service flows. PacketCable frequently performs this function when supported on the Cisco CMTS. However, this new command configures inactivity timeout where PacketCable is not active on the Cisco CMTS.



### Note

When PacketCable is supported, PacketCable sets the inactivity timeout from the PacketCable gate, and the PacketCable activity overrides timeout values set with this command. This is the case even where the inactivity timeout is set to zero, which configures the service flow to never timeout.

Apart from PacketCable, this command enables the cable modem to control the setup of the dynamic service flows, and to remove inactive service flows. During the creation of service flows, all Upstream and Downstream flows in the request are checked to see if the configured activity timeout needs to be applied.



### Note

The **cable service flow activity-timeout** command affects new calls only; it does not clear any existing hung flows. To clear existing flows, use the **test cable dsd <mac-add> <sid>** command.

## Examples

The following example in global configuration mode configures the cable modems connected to the Cisco CMTS to use activity timeout of zero, which means that related service flows do not timeout in a non-PacketCable environment:

```
Router(config)# cable service flow activity-timeout 0
```

## Related Commands

| Command                                        | Description                                                                                                              |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos profile</b>                       | Creates a DOCSIS 1.0 QoS profile.                                                                                        |
| <b>cable service flow inactivity-threshold</b> | Sets the amount of time a dynamic service-flow can be present in the system without any activity (DOCSIS 1.1 operation). |
| <b>cable service-flow inactivity-timeout</b>   | Sets the amount of time a dynamic service-flow can be present in the system without any activity (DOCSIS 1.0 operation). |
| <b>show cable service-class</b>                | Displays the service classes that have been created.                                                                     |

# cable service flow inactivity-threshold

To set the inactivity threshold value for service flows using Unsolicited Grant Service with Activity Detection (UGS-AD), use the **cable service flow inactivity-threshold** command in global configuration mode. To disable the inactivity timer and reset the threshold limit timer to its default of 10 seconds, so that service flows revert to UGS activity only, use the **no** form of this command.

**cable service flow inactivity-threshold** *n*

**no cable service flow inactivity-threshold** *n*

## Syntax Description

*n* Specifies the threshold limit in seconds, with 10 seconds as the default. Configurable limits are 1 to 3600 seconds.

## Command Default

The default is to enable the inactivity timer, with a default value of 10 seconds.

## Command Modes

Global configuration

## Command History

| Release    | Modification                                                                                             |
|------------|----------------------------------------------------------------------------------------------------------|
| 12.1(4)CX  | This command replaced the <b>cable service-flow inactivity-timeout</b> command for DOCSIS 1.1 operation. |
| 12.2(4)BC1 | Support for this command was added to the Release 12.2 BC train.                                         |

## Usage Guidelines

DOCSIS 1.1 allows a CM to request Unsolicited Grant Service (UGS) for an upstream, allowing the CM to reserve a certain amount of Constant Bit Rate (CBR) bandwidth for real-time traffic, such as Voice-over-IP (VoIP) calls. The UGS-AD variation allows the CMTS to switch a service flow to Real Time Polling Service (RTPS) after a certain period of inactivity, so that bandwidth is not reserved when it is not needed. The CM can then request UGS service when the flow again becomes active.



### Note

This command replaced the **cable service-flow inactivity-timeout** command, which was used in DOCSIS 1.0 operation to enable or disable watchdog cleanup of dynamic service flows that are not sending any packets on the upstream.



### Caution

The **cable service flow inactivity-threshold** command sets the inactivity timer for how long a service flow must be inactive before the CMTS can switch it from UGS-AD to RTPS. The **no cable service flow inactivity-threshold** command disables the timer and resets it to its default value of 10 seconds, so that the CMTS always provides UGS service to the service flow, even when the flow is idle.

The **no cable service flow inactivity-threshold** command effectively disables the use of RTPS and UGS-AD services and configures the CMTS to provide only UGS services. This will prevent a CM that registered for UGS-AD services from being able to obtain upstream transmission opportunities, resulting in a significant loss of bandwidth when a large number of CMs are requesting UGS-AD service flows.



## Examples

The following example shows the inactivity timer being set to 20 seconds:

```
Router(config)# cable service flow inactivity-threshold 20
Router(config)#
```

The following command disables the inactivity timer, so that the service flow remains UGS, even during periods of inactivity:

```
Router(config)# no cable service flow inactivity-threshold
Router(config)#
```

## Related Commands

| Command                                      | Description                                                                                                              |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>cable service class</b>                   | Sets the DOCSIS 1.1 service class parameters.                                                                            |
| <b>cable service-flow inactivity-timeout</b> | Sets the amount of time a dynamic service-flow can be present in the system without any activity (DOCSIS 1.0 operation). |
| <b>show controllers cable</b>                | Displays information for the cable interface.                                                                            |

# cable service-flow inactivity-timeout

To set the amount of time a dynamic service-flow can be present in the system without any activity, use the **cable service-flow inactivity-timeout** command in global configuration mode. To remove the specification, use the **no** form of this command.

**cable service-flow inactivity-timeout** *minutes*

**no cable service-flow inactivity-timeout**

## Syntax Description

*minutes* Specifies service-flow inactivity-timeout in minutes. Valid range is 1 to 120 minutes. Default value is 30 minutes.

## Command Default

30 minutes

## Command Modes

Global configuration

## Command History

| Release    | Modification                                                                                                      |
|------------|-------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC | This command was introduced.                                                                                      |
| 12.1(4)CX  | This command was replaced by the <b>cable service flow inactivity-threshold</b> command for DOCSIS 1.1 operation. |

## Usage Guidelines

Resources such as service identifiers (SIDs) and bandwidth are dynamically allocated by a CM using Dynamic Service Addition (DSA) transaction. If the CM fails to release these resources by issuing a Dynamic Service Deletion (DSD), then the resources might be locked indefinitely. Use this command to release unused resources.

## Examples

The following example shows how to set the inactivity timeout for dynamic service flows to 2 minutes. Once this setting is specified, any dynamic SID that does not show any activity in 2 minutes will be deleted.

```
Router(config)# cable service-flow inactivity-timeout 2
```

The following example shows how to set the inactivity timeout back to the default value of 30 minutes:

```
Router(config)# cable service-flow inactivity-timeout
```

## Related Commands

| Command                                        | Description                                                                                                              |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>cable service flow inactivity-threshold</b> | Sets the amount of time a dynamic service-flow can be present in the system without any activity (DOCSIS 1.1 operation). |
| <b>cable qos permission</b>                    | Specifies permission for updating the cable router QoS table.                                                            |

| Command                       | Description               |
|-------------------------------|---------------------------|
| <b>cable qos profile</b>      | Configures a QoS profile. |
| <b>show controllers cable</b> | Displays QoS profiles.    |

# cable service type

To redirect CMs matching a service-type to downstream frequency, use the **cable service type** command in global configuration mode. To cancel the redirection of CMs, use the **no** form of this command.

**cable service type** *service-type-id* **ds-frequency** *frequency*

**no cable service type** *service-type-id* **ds-frequency** *frequency*

Syntax Description

|                                      |                                                                                                                |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <i>service-type-id</i>               | Specifies the service type identifier to be redirected.<br>The maximum length of <i>service-type-id</i> is 16. |
| <b>ds-frequency</b> <i>frequency</i> | Specifies the downstream frequency the CMs will be redirected to.                                              |

Command Default

Disabled

Command Modes

Global configuration (config)

Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

Usage Guidelines

This command will redirect the CMs matching a particular service-type identifier to downstream frequency. Multiple service types can be redirected to one frequency. However, one service type cannot be redirected to multiple DS frequencies.

Examples

The following example shows how to redirect the CMs matching the service type to downstream frequency:

```
Router(config)# cable service type commercial ds-frequency 519000000
```

# cable set mpls-experimental

To specify experimental bits for Multiprotocol Label Switching (MPLS) labels, use the **cable set mpls-experimental** command in Ethernet service configuration mode. To disable this configuration, use the **no** form of this command.

**cable set mpls-experimental** *value*

**no cable set mpls-experimental** *value*

## Syntax Description

|              |                                                                 |
|--------------|-----------------------------------------------------------------|
| <i>value</i> | Experimental bit for MPLS labels. Valid values are from 0 to 7. |
|--------------|-----------------------------------------------------------------|

## Command Default

If this command is not used, the experimental bits on the MPLS label are set to zero.

## Command Modes

Ethernet service configuration (config-ethsrv)

## Command History

| Release     | Modification                                                  |
|-------------|---------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

## Usage Guidelines

The experimental bits are set for all inner and outer MPLS labels for the egress Layer 2 VPN traffic on the WAN interface.

## Examples

The following example shows how to set an experimental bit for MPLS labels on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# cable l2vpn 0000.396e.6a68 customer1
Router(config-l2vpn)# service instance 2000 Ethernet
Router(config-ethsrv)# xconnect 101.1.0.2 221 encapsulation mpls pw-type 4
Router(config-ethsrv)# cable set mpls-experimental 7
```

## Related Commands

| Command                 | Description                                                         |
|-------------------------|---------------------------------------------------------------------|
| <b>cable l2vpn</b>      | Enables Ethernet L2VPN service and enters L2VPN configuration mode. |
| <b>service instance</b> | Configures an Ethernet service instance for a particular customer.  |
| <b>xconnect</b>         | Binds an attachment circuit to a pseudowire.                        |

# cable sflog

To enable service flow logging and to configure the number and duration of entries in the log, use the **cable sflog** command in global configuration mode. To disable service flow logging, use the **no** form of the command.

**cable sflog max-entry number entry-duration time**

**no cable sflog**

## Syntax Description

|                                                                                                                                                                                                             |                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>max-entry number</b>                                                                                                                                                                                     | Specifies the maximum number of entries in the service flow log. When the log becomes full, the oldest entries are deleted to make room for new entries. The valid range is 0 to 59999, with a default of 0 (which disables service flow logging). |
| <b>Note</b> The <b>max-entry</b> value applies to the entire chassis on the Cisco uBR7100 series and Cisco uBR7200 series routers, but applies to individual cable line cards on the Cisco uBR10012 router. |                                                                                                                                                                                                                                                    |
| <b>entry-duration time</b>                                                                                                                                                                                  | Specifies how long, in seconds, entries can remain in the service flow log. The CMTS deletes entries in the log that are older than this value. The valid range is 1 to 86400 seconds, with a default value of 3600 seconds (1 hour).              |

## Defaults

**max-entry** = 0 (service flow logging is disabled) and **entry-duration** = 3600 seconds

## Command Modes

Global configuration

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(15)BC1 | This command was introduced. |

## Usage Guidelines

A DOCSIS specification currently being developed requires the DOCSIS CMTS to maintain a log table that contains entries of deleted service flows. The **cable sflog** command enables the logging of deleted service flows in this table and also sets the maximum number of entries in the log. When the log becomes full, the oldest entries are deleted to make room for the newest ones.

This command also configures how long each entry can remain in the log. When an entry has been in the table for the specified time, the CMTS deletes it, even if the log is not currently full.

To display the service flow log, use SNMP commands to display the docsQosServiceFlowLogEntry entries in the docsQosServiceFlowLogTable table. These attributes are defined in the *Data Over Cable System Interface Specification Quality of Service Management Information Base (DOCSIS-QOS MIB)* internet draft.

Cisco IOS Release 12.2(15)BC1 supports version 4 of this DOCSIS-QOS MIB draft, which is available on the IETF Internet-Drafts web site:

<http://http://www.ietf.org/ID.html>

**Note**

At the time of this document's release, the DOCSIS-QOS MIB is still in draft form and is therefore subject to change in future releases of Cisco IOS software.

The **max-entry** value specified by this command applies to the entire chassis for the Cisco uBR7100 series and Cisco uBR7200 series routers, but to individual line cards on the Cisco uBR10012 router. However, the Cisco uBR10012 router still maintains only one log table for all deleted service flows.

For example, if the **max-entry** value is set to 10,000 on a Cisco uBR7200 series router, the service flow log table holds a maximum of 10,000 entries for all cable line cards in the chassis. If the **max-entry** value is set to 10,000 on a Cisco uBR10012 router that has four cable line cards installed, the service flow log table holds a maximum of 40,000 entries, with each cable line card having a maximum of 10,000 entries each.

**Examples**

The following example shows how to enable service flow logging with a maximum of 2,000 entries in the log, and with each entry remaining in the log for a maximum of 2 hours (7200 seconds):

```
Router(config)# cable sflog max-entry 2000 entry-duration 7200
```

The following example shows how to set the **max-entry** value to its default of 0 and disable service flow logging:

```
Router# configure terminal
Router(config)# no cable sflog
Router(config)# exit
Router#
```

**Related Commands**

| Command                                        | Description                                                                                                              |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>cable service-flow inactivity-timeout</b>   | Sets the amount of time a dynamic service-flow can be present in the system without any activity (DOCSIS 1.0 operation). |
| <b>cable service flow inactivity-threshold</b> | Sets the amount of time a dynamic service-flow can be present in the system without any activity (DOCSIS 1.1 operation). |

# cable shared-secondary-secret

To configure one or more secondary shared-secret keys that CMs can use to successfully process the DOCSIS configuration file and register with the CMTS, use the **cable shared-secondary-secret** command in cable interface configuration mode. To remove the secondary shared secrets, use the **no** form of this command.

**cable shared-secondary secret index** *index-num* [**0** | **7**] *authentication-key*

**no cable shared-secondary secret index** *index-num*

## Syntax Description

|                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>index</b> <i>index-num</i>                                                                                                                                                                                                                                       | Specifies the order in which the CMTS will use the secondary shared-secrets to verify the CM during the registration process. The valid range is 1 to 16.                                                                          |
| <b>0</b>                                                                                                                                                                                                                                                            | (Optional) Specifies that an unencrypted message will follow.                                                                                                                                                                      |
| <b>7</b>                                                                                                                                                                                                                                                            | (Optional) Specifies that an encrypted message will follow.                                                                                                                                                                        |
| <b>Note</b> As a general rule, the <b>7</b> option is not used by users at the command line because it requires a pre-encrypted password. Typically, the <b>7</b> option is useful only when cutting and pasting commands from another router's configuration file. |                                                                                                                                                                                                                                    |
| <i>authentication-key</i>                                                                                                                                                                                                                                           | Text string specifying the shared secret string. When you also use the <b>service password-encryption</b> command, the key is stored in encrypted form. The text string can be any arbitrary string up to 80 characters in length. |

## Defaults

No secondary shared secret is used. If no encryption option is specified, the key is stored in the configuration file as encrypted text if the **service password-encryption** command has also been given.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release    | Modification                 |
|------------|------------------------------|
| 12.2(8)BC2 | This command was introduced. |

## Usage Guidelines

The **cable shared-secondary-secret** command can be used to supplement the **cable shared-secret** command so as to prevent unauthorized interception and alteration of the DOCSIS configuration file that is downloaded to the CM during the registration process. The DOCSIS specification allows for a CM and CMTS to use a shared secret (a secret encryption string) to calculate the MD5 Message Integrity Check (MIC) value for the DOCSIS configuration file that is downloaded to the CM.

The CM must use the proper shared secret encryption string to successfully decrypt and process the configuration file, and then register with the CMTS. If the CM does not have the proper encryption string, it will be unable to calculate the proper MIC value, and the **show cable modem** command will show **reject(m)** for the modem to indicate a MIC authentication failure.



The **cable shared-secondary-secret** command allows a cable operator to specify up to 16 alternate DOCSIS shared secrets. If a CM has a MIC authentication failure during registration, the CMTS then checks the MIC values using the alternate shared secrets. If a match is found, the CM is allowed online. If none of the alternate MIC values match the value returned by the CM, the CMTS refuses to allow the CM to come online and instead logs a MIC authentication failure.

The use of secondary shared secrets allow the MSO to gradually phase in changes to the shared secret key. If a shared secret has been compromised, or if the MSO decides to regularly change the shared secret, the MSO can use the **cable shared-secret** command to immediately change the primary shared secret. The previous key can then be made a secondary shared secret, using the **cable shared-secondary-secret** command, so that CMs can continue to register until the MSO can change all of the DOCSIS configuration files to use the new shared secret.

To use the secondary shared-secret feature, you must do the following:

- You must specify a shared secret with the **cable shared-secret** command. The **cable shared-secondary-secret** command has no effect if you have not specified a primary shared secret.



#### Note

At any particular time, the majority of CMs should use the primary shared secret to avoid excessive registration times.

- Create DOCSIS configuration files that use the shared-secret encryption string to create the MD5 MIC value. This can be done using the Cisco DOCSIS Configurator tool by entering the shared-secret string in the **CMTS Authentication** field in the **Miscellaneous** parameters.



#### Tip

The shared-secret string itself is not saved in the DOCSIS configuration file, so you must re-enter the string in the **CMTS Authentication** field whenever you create or edit a DOCSIS configuration file using the Cisco DOCSIS Configurator tool.

- Use the **cable shared-secondary-secret** command to configure the cable interfaces with one or more matching shared-secret strings. The string configured on an interface must match the string used to create the DOCSIS configuration files downloaded to the CMs on that interface, or the CMs will not be able to register. You can use different shared secrets for each interface, if you are also using a different set of configuration files for each interface.
- To encrypt the shared-secret strings in the CMTS configuration, you must include the **service password-encryption** global configuration command in the router's configuration.



#### Note

You cannot use the shared secret feature with the files created by the internal DOCSIS configuration file editor (**cable config-file** command).

### Examples

The following example shows how to specify multiple secondary shared-secret string using encrypted keys:

```
Router# config t
Router(config)# service password-encryption
Router(config)# int c6/0
Router(config-if)# cable shared-secret n01jk_1a
Router(config-if)# cable shared-secondary-secret index 1 cabl3-x21b
Router(config-if)# cable shared-secondary-secret index 2 dasc9_ruld55ist5q3z
Router(config-if)# cable shared-secondary-secret index 3 j35u556_x_0
Router(config-if)# exit
```

```
Router(config)# exit
Router# show running-config | include shared
cable shared-secret 7 1407513181A0F13253920
cable shared-secondary-secret 7 14031A021F0D39263D3832263104080407
cable shared-secondary-secret 7 071B29455D000A0B18060615142B38373F3C2726111202431259545D6
cable shared-secondary-secret 7 0501555A34191B5F261D28420A555D
Router#
```

**Note**

In this example, the shared-secret strings are initially entered as clear text, but because the **service password-encryption** command has been used, the strings are encrypted in the configuration file.

**Related Commands**

| Command                     | Description                                                                                                                                                                                                              |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable dynamic-secret</b> | Enables the dynamic shared secret feature, so that DOCSIS configuration files are verified with a dynamically generated shared secret.                                                                                   |
| <b>cable shared-secret</b>  | Configures an authentication shared-secret key that CMs must use to successfully process the DOCSIS configuration file and register with the CMTS.                                                                       |
| <b>cable tftp-enforce</b>   | Requires that all CMs on a cable interface attempt to download a DOCSIS configuration file using the Trivial File Transfer Protocol (TFTP) through the cable interface before being allowed to register and come online. |

# cable shared-secret

To configure an authentication shared-secret encryption key that CMs must use to successfully process the DOCSIS configuration file and register with the CMTS, use the **cable shared-secret** command in cable interface configuration mode. To disable the use of a shared-secret key during the CM registration phase, use the **no** form of this command.

**cable shared-secret** [**0** | **7**] *authentication-key*

**no cable shared-secret**

|                    |                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                    |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>0</b>                                                                                                                                                                                                                                                            | (Optional) Specifies that an unencrypted message (clear text) will follow.                                                                                                                                                         |
|                    | <b>7</b>                                                                                                                                                                                                                                                            | (Optional) Specifies that an encrypted message will follow.                                                                                                                                                                        |
|                    | <b>Note</b> As a general rule, the <b>7</b> option is not used by users at the command line because it requires a pre-encrypted password. Typically, the <b>7</b> option is useful only when cutting and pasting commands from another router's configuration file. |                                                                                                                                                                                                                                    |
|                    | <i>authentication-key</i>                                                                                                                                                                                                                                           | Text string specifying the shared secret string. When you also use the <b>service password-encryption</b> command, the key is stored in encrypted form. The text string can be any arbitrary string up to 80 characters in length. |

|          |                                                                                                                                                                                                                                                                                                                                            |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Defaults | No shared-secret encryption key is used during registration, only the default DOCSIS MD5-encrypted checksum. When <b>cable shared-secret</b> is given without specifying an encryption option, the key is stored in the configuration file as an encrypted password if the <b>service password-encryption</b> command has also been given. |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|               |                                                |
|---------------|------------------------------------------------|
| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 11.3 XA        | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | <p>The <b>cable shared-secret</b> command can be used to prevent unauthorized interception and alteration of the DOCSIS configuration file that is downloaded to the CM during the registration process. The <b>cable shared-secret</b> command specifies a secret encryption string that the CMTS uses to calculate the MD5 Message Integrity Check (MIC) value that is appended to every DOCSIS configuration file and that the CM and CMTS use to verify the file's integrity.</p> <p>The CM must use the shared secret encryption string to successfully decrypt and process the configuration file, and then register with the CMTS. If the CM does not have the proper encryption string, it will be unable to calculate the proper MIC value, and the <b>show cable modem</b> command will show <b>reject(m)</b> for the modem to indicate a MIC authentication failure.</p> |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

To use the shared-secret feature, you must do the following:

- Create DOCSIS configuration files that use the shared-secret encryption string to create the MD5 MIC value. This can be done using the Cisco DOCSIS Configurator tool by entering the shared-secret string in the **CMTS Authentication** field in the **Miscellaneous** parameters.



**Note** The shared-secret string itself is not saved in the DOCSIS configuration file, so you must re-enter the string in the **CMTS Authentication** field whenever you create or edit a DOCSIS configuration file using the Cisco DOCSIS Configurator tool.

- Use the **cable shared-secret** command to configure the cable interfaces with a matching shared-secret string. The string configured on an interface must match the string used to create the DOCSIS configuration files downloaded to the CMs on that interface, or the CMs will not be able to register. You can use different shared secrets for each interface, if you are also using a different set of configuration files for each interface.
- To encrypt the shared-secret string in the CMTS configuration, you must include the **service password-encryption** global configuration command in the router's configuration.



**Note** You cannot use the shared secret feature with the files created by the internal DOCSIS configuration file editor (**cable config-file** command).



**Note** In Cisco IOS Release 12.2(8)BC2 and later releases, you can also use the **cable shared-secondary-secret** command to specify multiple shared-secret strings, so that you can gradually phase in a new shared secret string.

### Upgrading When Using Shared Secret Passwords

Cisco IOS Release 12.2 BC changed the encryption algorithm used for the **cable shared-secret** command. If you are upgrading from a Cisco IOS 12.1 EC or 12.0 SC release, you cannot cut and paste the **cable shared-secret** configuration lines that include an encrypted password. Instead, you must re-enter the original shared secret passwords at the CLI prompt, and then resave the configuration.

For example, if the actual shared secret password is “cm-sharedsecret-password”, enter the **cable shared-secret cm-sharedsecret-password** command at the CLI prompt. If you have enabled password encryption, the configuration file will then show only the newly encrypted password.



**Note** This change affects only the encryption of the passwords that are stored in the configuration file. It does not affect the actual encryption that is used between the CMTS and CMs, so you do not need to change the shared secret in the DOCSIS configuration files for the CMs.

### Examples

The following example shows how to specify a shared-secret string using an encrypted key:

```
Router# config t
Router(config)# service password-encryption
Router(config)# int c6/0
Router(config-if)# cable shared-secret password
Router(config-if)# exit
Router(config)# exit
Router# show running-config | include shared
cable shared-secret 7 1407513181A0F13253920
```

**Note**

Router#

In this example, the shared-secret string is initially entered as clear text, but because the **service password-encryption** command has been used, the string is encrypted in the configuration file.

The following example shows how to remove the use of a shared-secret encryption key on a cable interface. That particular interface then ignores any shared-secret that is used when calculating the MD5 checksum:

```
Router# config t
Router(config)# int c6/0
Router(config-if)# no cable shared-secret
Router(config-if)# end
Router#
```

**Related Commands**

| Command                              | Description                                                                                                                                                                                                              |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable dynamic-secret</b>          | Enables the dynamic shared secret feature, so that DOCSIS configuration files are verified with a dynamically generated shared secret.                                                                                   |
| <b>cable shared-secondary-secret</b> | Configures one or more secondary shared-secret keys that CMs can use to successfully process the DOCSIS configuration file and register with the CMTS.                                                                   |
| <b>cable tftp-enforce</b>            | Requires that all CMs on a cable interface attempt to download a DOCSIS configuration file using the Trivial File Transfer Protocol (TFTP) through the cable interface before being allowed to register and come online. |

# cable sid-cluster-group

To configure a SID cluster group on a cable interface line card, use the **cable sid-cluster-group** command in cable interface configuration mode. To disable the configuration, use the **no** form of this command.

**cable sid-cluster-group** [*dynamic* | *req-multiplier value* | *num-of-cluster number*]

**no cable sid-cluster-group** [*dynamic* | *req-multiplier value* | *num-of-cluster number*]

## Syntax Description

|                                     |                                                                                                                                                                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dynamic</b>                      | If specified, the SID cluster is dynamically derived based on the service flow rate.                                                                                                                                  |
| <b>req-multiplier</b> <i>value</i>  | Specifies the queue-depth request byte multiplier. Valid values are 1, 2, 4, 8, and 16. A cable modem uses queue-depth based requesting for all bandwidth requests, if the Multiple Transmit Channel mode is enabled. |
| <b>num-of-cluster</b> <i>number</i> | Specifies the number of SID clusters. Valid values are from 1 to 8. The default value is 1.                                                                                                                           |

## Command Default

None

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                                                  |
|-------------|---------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

## Usage Guidelines

Configure the **cable sid-cluster-group num-of-cluster 2** command to achieve desired upstream bonded speeds. Alternatively, use a large upstream Max Traffic burst in the cable modem file (such as 30 kB). The Max Concat burst in the cable modem file need not be changed because DOCSIS 3.0 uses continuous concatenations and fragmentation (CCF) and can therefore use the default value of 3044 in the Max Concat field.

If the **cable sid-cluster-group** command is not used, the router accepts the default SID cluster configuration. By default, only one SID cluster is configured.

## Examples

The following example shows how to configure a SID cluster on a cable interface in slot 5, subslot 1, and port 0 on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable 5/1/0
Router(config-if)# cable sid-cluster-group
Router(config-if)# cable sid-cluster-group dynamic
Router(config-if)# cable sid-cluster-group req-multiplier 8
Router(config-if)# cable sid-cluster-group num-of-cluster 2
```

**Associated Features** The **cable sid-cluster-group** command is used to configure the [Upstream Channel Bonding](#) feature.

| Related Commands | Command                            | Description                                                               |
|------------------|------------------------------------|---------------------------------------------------------------------------|
|                  | <b>cable sid-cluster-switching</b> | Specifies SID cluster switchover criteria on a cable interface line card. |

# cable sid-cluster-switching

To specify Service ID (SID) cluster switchover criteria on a cable interface line card, use the **cable sid-cluster-switching** command in cable interface configuration mode. To disable the configuration, use the **no** form of this command.

**cable sid-cluster-switching** [**max-outstanding-byte** *value* | **max-request** *value* | **max-time** *seconds* | **max-total-byte** *value*]

**no cable sid-cluster-switching** [**max-outstanding-byte** *value* | **max-request** *value* | **max-time** *seconds* | **max-total-byte** *value*]

## Syntax Description

|                                          |                                                                                                                                                                             |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>max-outstanding-byte</b> <i>value</i> | (Optional) Specifies the total size, in bytes, for outstanding requests using the SID cluster. The valid values are from 0 to 4294967295.                                   |
| <b>max-request</b> <i>value</i>          | (Optional) Specifies the maximum number of requests that can be made using the SID cluster. The valid values are from 0 to 255. The default value is 1.                     |
| <b>max-time</b> <i>milliseconds</i>      | (Optional) Specifies the total time, in milliseconds, that a service flow can continue to use the SID cluster for bandwidth requests. The valid values are from 0 to 65535. |
| <b>max-total-byte</b> <i>value</i>       | (Optional) Specifies the total number of bytes that can be requested using the SID cluster. The valid values are from 0 to 4294967295.                                      |

## Command Default

None

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                                                  |
|-------------|---------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

## Usage Guidelines

If the service flow has only one SID cluster and the SID cluster switchover criterion limit is met, the cable modem stops sending bandwidth requests until the SID cluster is cleared.

The SID cluster configuration along with switchover criterion may impact overall system performance. So we recommend not to customizing switchover criterion unless justified. The default switchover criterion will meet most of the requirements. If the **cable sid-cluster-switching** command is not used, the router accepts the default SID cluster switchover criterion. That is only one request can be made using the SID cluster.



## Examples

The following example shows how to specify SID cluster switchover criteria on a cable interface in slot 5, subslot 1, and port 0 on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable 5/1/0
Router(config-if)# cable sid-cluster-switching
Router(config-if)# cable sid-cluster-switching max-outstanding-byte 4444
Router(config-if)# cable sid-cluster-switching max-request 222
Router(config-if)# cable sid-cluster-switching max-time 444
Router(config-if)# cable sid-cluster-switching max-total-byte 67890
```

## Related Commands

| Command                        | Description                                              |
|--------------------------------|----------------------------------------------------------|
| <b>cable sid-cluster-group</b> | Configures a SID cluster on a cable interface line card. |

# cable source-route

To configure the virtual routing and forwarding instance (VRF) source route, use the **cable source-route** command in the cable modem's subinterface configuration mode. To disable the route, use the **no** form of this command.

**cable source-route**

**no cable source-route**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The VRF source route is not configured.

## Command Modes

Subinterface configuration (config-subif)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCF | This command was introduced. |

## Examples

The following example shows how to configure the VRF source route:



### Note

This command is supported on the Cisco uBR10012 broadband routers only.

```
Router(config-subif)# cable source-route
```

## Related Commands

| Command                                   | Description                                                          |
|-------------------------------------------|----------------------------------------------------------------------|
| <b>cable vrf-steering<br/>cable-modem</b> | Steers or directs the cable modems to the specified VRF.             |
| <b>ip vrf</b>                             | Defines a VRF instance and enters the interface configuration mode.  |
| <b>show ip arp vrf</b>                    | Displays which VRF contains a specific cable modem in the ARP table. |

# cable source-verify

To enable verification of IP addresses for CMs and CPE devices on the upstream, use the **cable source-verify** command in cable interface or subinterface configuration mode. To disable verification, use the **no** form of this command.

**cable source-verify** [**dhcp** | **leasetimer** *value*]

**no cable source-verify**

## Syntax Description

|                                |                                                                                                                                                                                                                                          |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dhcp</b>                    | (Optional) Specifies that queries will be sent to verify unknown source IP addresses in upstream data packets.                                                                                                                           |
| <b>leasetimer</b> <i>value</i> | (Optional) Specifies the time, in minutes, for how often the router should check its internal CPE database for IP addresses whose lease times have expired. The valid range for value is 1 to 240 minutes, with a default of 60 minutes. |

## Command Default

Disabled. When the **dhcp** option is specified, the **leasetimer** option defaults to 60 minutes.

## Command Modes

Interface configuration (config-if)  
Subinterface configuration (config-subif)

## Command History

| Release                    | Modification                                                                                                                                                                                                           |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 XA                    | This command was introduced.                                                                                                                                                                                           |
| 12.0(7)T                   | The <b>dhcp</b> keyword was added.                                                                                                                                                                                     |
| 12.0(10)SC, 12.1(2)EC      | Support was added for these trains.                                                                                                                                                                                    |
| 12.1(3a)EC                 | Subinterface support was added.                                                                                                                                                                                        |
| 12.1(13)EC,<br>12.2(11)BC1 | The <b>leasetimer</b> keyword was added.                                                                                                                                                                               |
| 12.2(15)BC1                | The verification of CPE devices was changed when using the <b>dhcp</b> keyword.                                                                                                                                        |
| 12.2(15)BC2                | Support for verifying CMs and CPE devices that are on a different subnet than the cable interface was enhanced to use Reverse Path Forwarding (RFP).                                                                   |
| 12.3(9a)BC                 | Cisco IOS Release 12.3(9a)BC adds the option of using a per SID basis for deriving lease queries from CPE devices. This release also introduces a global rate limit for lease queries initiated by downstream traffic. |

## Usage Guidelines

Configuring the **cable source-verify** command on the master interface of a bundle will configure it for all of the slave interfaces in the bundle as well.

The **cable source-verify** command helps to prevent the spoofing of IP addresses by CMs or their CPE devices by verifying that the upstream packets coming from each CM are known to be associated with the IP address in that packet. Packets with IP addresses that do not match those associated with the CM are dropped.

In order to protect the Cisco CMTS from denial of service attacks, Cisco IOS Release 12.3(9a)BC adds the option of using a per SID basis for deriving leasequeries from CPE devices. This release also introduces a global rate limit for leasequeries initiated by downstream traffic. These enhancements reduce the CPU utilization of Dynamic Host Configuration Protocol (DHCP) Receive and ISR processes when the Cisco CMTS is configured with the **cable source-verify dhcp** and **no cable arp** commands.

When **cable source-verify dhcp** and **no cable arp** commands are configured, DHCP leasequery is sent for downstream packets to verify unknown IP addresses within the IP address range configured on the cable bundle interface.

For DHCP leasequery to work in the downstream direction, the Cisco Network Registrar (CNR) should be made aware of the DHCP Option 82. This is required to make the CMTS map the CPE IP address to the correct CM. To do this, configure the **ip dhcp relay information option** command on the bundle interface to insert service class relay agent option into the DHCP DISCOVER messages. When the configuration is in place, during DHCP DISCOVER, the values of DHCP Option 82 is cached by the CNR and is returned to the CMTS on any subsequent DHCP leasequery for that IP address.

The Cisco CMTS maintains a database that links the MAC and IP addresses of known CPE devices with the CMs that are providing network access for those CPE devices. The CMTS typically populates this database with information obtained by examining the DHCP packets sent between the CPE devices and the DHCP server. Other IP traffic provides information about which CMs service which CPE devices.

After the **cable source-verify** command is issued, every IP upstream packet is examined. If the IP and MAC addresses of the CPE device are already associated with a known, online CM, it is allowed through. If not, the source IP address is examined to determine if it belongs to the cable network. If so, and if the **dhcp** option is not used, the packet is allowed through.

### Using the dhcp Option



#### Note

Do not enable the local DHCP server on the Cisco CMTS and configure local DHCP address pools using the **ip dhcp pool** command, when using **dhcp** option, because this prevents DHCP address validation.

If the **dhcp** option is used, all packets with unknown IP addresses within the cable network are dropped, but the Cisco CMTS sends a DHCP leasequery message to the DHCP server to verify the IP address. If a valid response is received from the DHCP server, the CMTS updates its database with the new CPE device and allows future traffic through. If the DHCP server does not return a successful response, all traffic from the CPE is dropped.

In Cisco IOS Release 12.2(15)BC1 and later releases, the **dhcp** option extends the verification to CPE devices that had been online using a valid IP address but then were reconfigured by the user with an unused static IP address. With Cisco IOS Release 12.2(15)BC1 and later, CPE devices are not allowed online when they are using static IP addresses that have not been allocated by the DHCP server. If you are using the **dhcp** option, the CPE device must use an IP address that has been assigned by the DHCP server.



#### Note

You must enable the **ip dhcp relay information option** command to properly trigger the leasequery after configuring the **cable source-verify dhcp** command. If the **ip dhcp relay information option** command is not enabled, the leasequery does not recover the IP address of the CPE properly.

**Note**

The **dhcp** option automatically blocks all statically-assigned IP addresses unless the DHCP server has been configured to recognize those addresses and respond with the appropriate leasequery response.

The **cable source-verify** command by itself prevents someone from stealing another customer's IP address. The **cable source-verify dhcp** command adds another level of security by refusing access to any CPE device with an IP address that has not been assigned by the DHCP server.

**Note**

This **dhcp** option requires that the DHCP server support the leasequery message. The CNR supports leasequery in version 7.0 onwards. The leasequery message is defined in an IETF draft, and available at the URL: <http://www.ietf.org/rfc/rfc4388.txt>

**Caution**

Do not enable the local DHCP server on the Cisco CMTS and configure local DHCP address pools, using the **ip dhcp pool** command, when you are also enabling the **cable source-verify dhcp** command, because the DHCP server on the Cisco CMTS can intercept the leasequery messages and prevent them from reaching the external DHCP server. This in turn prevents address validation from succeeding because the DHCP server on the Cisco CMTS does not support leasequery messages.

**Note**

When the **cable source-verify dhcp** feature is enabled, and a statically-defined IP address has been added to the CMTS for a CM using the **cable trust** command to override the **cable source-verify dhcp** checks for this device, packets from this CM will continue to be dropped until an entry for this CM is added to the ARP database of the CMTS. To achieve this, disable the **cable source-verify dhcp** feature, ping the CMTS from the CM to add an entry to the ARP database, and re-enable the **cable source-verify dhcp** feature.

### Using the leasetimer Option

**Note**

The **leasetimer** option takes effect only when the **dhcp** option is also used on an interface. Also, this option is supported only on the master interface and cannot be configured on subinterfaces. Configuring it for a master interface automatically applies it to all subinterfaces.

The **leasetimer** option adds another level of verification by activating a timer that periodically examines the lease times for the IP addresses for known CPE devices. If the CMTS discovers that the DHCP lease for a CPE device has expired, it removes that IP address from its database, preventing the CPE device from communicating until it makes another DHCP request. This prevents users from treating DHCP-assigned addresses as static addresses, as well as from using IP addresses that were previously assigned to other devices.

**Note**

The **leasetimer** option is active only if you have also specified the **cable source-verify dhcp** command for the cable interface. If the **dhcp** option is not used, the leasetimer option has no effect. In addition, the **leasetimer** option can be configured only on an interface, not a subinterface. Applying it to a master interface automatically applies it to all subinterfaces.

The **leasetimer** option allows you to configure how often the timer checks the lease times, so as to specify the maximum amount of time a CPE device can use an IP address that was previously assigned by the DHCP server but whose lease time has since expired. The time period can range from 1 minute

to 240 minutes (4 hours), with a grace period of 2 minutes to allow a PC enough time to make a DHCP request to renew the IP address. To turn off the timer, so that the CMTS no longer checks the lease times, issue the **cable source-verify** command without the **dhcp** option, or turn off the feature entirely with the **no cable source-verify** command.

### Using Multiple Subnets

In Cisco IOS Release 12.2(15)BC2 and later releases, the **cable source-verify** command can verify IP addresses that are on different subnets than what is being used on the cable interface or subinterfaces only when Reverse Path Forwarding (RPF) is used in conjunction.



#### Note

You must enable RPF before running the **cable source-verify** command to verify IP addresses on subinterfaces.

### Examples

The following example shows how to enable RPF before running the **cable source-verify** command to verify IP addresses on subinterfaces:

```
Router# configure terminal
Router(config)# ip cef
Router(config)# interface cable 4/0
Router(config-if)# ip verify unicast source reachable-via rx
```



#### Note

Beginning with Cisco IOS Release 12.2(33)SCA, **ip verify unicast source reachable-via rx** command must be used with the **allow-default** keyword.

The following example shows how to turn on CM upstream verification and configures the Cisco CMTS router to send DHCP leasequeries to verify unknown source IP addresses in upstream data packets:

```
Router# configure terminal
Router(config)# interface cable 4/0
Router(config-if)# cable source-verify dhcp
Router(config-if)#
```

The following example shows how to enable the **leasetimer** feature so that every two hours, the CMTS checks the IP addresses in the CPE database for that particular interface for expired lease times:

```
Router# configure terminal
Router(config)# interface cable 1/0
Router(config-if)# cable source-verify dhcp
Router(config-if)# cable source-verify leasetimer 120 #
```

The following example shows how to configure the cable interface so that the CMTS can verify IP addresses that are on a different subnet than the one that the cable interface is using:

```
Router# configure terminal
Router(config)# ip cef
Router(config)# interface cable 7/0/0
Router(config-if)# ip verify unicast source reachable-via rx
Router(config-if)# cable source-verify dhcp
```

The following example shows the error message that is displayed if you try to configure the **leasetimer** option on a subinterface, instead of an interface:

```
Router# configure terminal
Router(config)# interface cable 1/0.1
Router(config-subif)# cable source-verify dhcp
Router(config-subif)# cable source-verify leasetimer 120
```

| Related Commands | Command                                                 | Description                                                                                                                                                                                                                                                        |
|------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable arp</b>                                        | Enables or disables the use of the ARP protocol for CMs and their CPE devices.                                                                                                                                                                                     |
|                  | <b>cable helper-address</b>                             | Specifies a destination IP address for User Datagram Protocol (UDP) broadcast (DHCP) packets.                                                                                                                                                                      |
|                  | <b>cable dhcp-giaddr</b>                                | Modifies the GIADDR field of DHCP DISCOVER and DHCPREQUEST packets with a Relay IP address before they are forwarded to the DHCP server.                                                                                                                           |
|                  | <b>cable logging badipsource</b>                        | Logs error messages about bad IP source addresses on the cable interfaces.                                                                                                                                                                                         |
|                  | <b>cable relay-agent-option</b>                         | Enables the system to insert the CM MAC address into a DHCP packet received from a CM or host and forward the packet to a DHCP server.                                                                                                                             |
|                  | <b>cable source-verify leasequery-filter downstream</b> | Controls the number of DHCP leasequery request messages that are sent for unknown IP addresses on all cable downstream interfaces on the Cisco CMTS router.                                                                                                        |
|                  | <b>cable source-verify leasequery-filter upstream</b>   | Controls the number of DHCP leasequery request messages that are sent for unknown IP addresses per each service ID (SID) on an upstream.                                                                                                                           |
|                  | <b>clear cable logging</b>                              | Removes all error messages about bad IP source addresses on the cable interfaces from the error log buffer.                                                                                                                                                        |
|                  | <b>ip dhcp relay information option</b>                 | Enables the system to insert the CM MAC address into a DHCP packet received from a CM or host and forward the packet to a DHCP server.                                                                                                                             |
|                  | <b>ip dhcp smart-relay</b>                              | Monitors client retransmissions when address pool depletion occurs.                                                                                                                                                                                                |
|                  | <b>ip verify unicast reverse-path</b>                   | Enables Unicast Reverse Path Forwarding (Unicast RPF), which checks each packet received on an interface to verify that the packet's source IP address appears in the routing tables as belonging to that interface, so as to prevent spoofed IP source addresses. |

# cable source-verify enable-sav-static

To enable source address verification (SAV) on the Cisco CMTS, use the **cable source-verify enable-sav-static** command in global configuration mode. To disable the SAV, use the **no** form of this command.

**cable source-verify enable-sav-static**

**no cable source-verify enable-sav-static**

## Syntax Description

This command has no arguments or keywords.

## Command Default

SAV is disabled by default

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

The **cable source-verify enable-sav-static** command allows you to enable of SAV prefix processing on the Cisco CMTS. If the SAV feature is enabled, the SAV prefixes are matched during source verification. If the feature is disabled the SAV prefixes are not matched, and the configured SAV prefixes do not have any impact on the outcome of the source verification.

This feature is disabled by default.

## Examples

The following example shows how to enable SAV prefix processing on the Cisco CMTS:

```
Router(config)# cable source-verify enable-sav-static
```



| Related Commands | Command                          | Description                                      |
|------------------|----------------------------------|--------------------------------------------------|
|                  | <b>cable source-verify group</b> | Configures SAV groups.                           |
|                  | <b>prefix</b>                    | Configures IPv4 or IPv6 prefixes in a SAV group. |

# cable source-verify group

To configure the source address verification (SAV) prefix group, use the **cable source-verify group** command in global configuration mode. To disable the use of configured SAV prefix group, use the **no** form of this command.

**cable source-verify group** *groupname*

**no cable source-verify group** *groupname*

|                    |                  |                                                                                                               |
|--------------------|------------------|---------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>groupname</i> | Name of the SAV prefix group. The <i>groupname</i> can be any arbitrary string up to 15 characters in length. |
|--------------------|------------------|---------------------------------------------------------------------------------------------------------------|

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCC | This command was introduced. |

**Usage Guidelines**

The **cable source-verify group** command is used to configure SAV groups. A SAV group is a group of IPv4 or IPv6 prefixes. The Cisco CMTS uses these prefixes to authenticate a cable modem (CM). A CM may be configured with an IPv4 or IPv6 prefix belonging to a particular SAV group. The time, length, value (TLV) 43.7.1 specifies the group name to which a given CM belongs. The Cisco CMTS considers a packet from a CM authorized if that packet is sourced with an IP address that belongs to the configured prefix in a SAV group.

A maximum of 255 SAV groups can be configured on a Cisco CMTS, with each SAV group containing up to four IPv4s, IPv6s, or a combination of both the prefixes (totalling up to four)..

**Examples**

The following example shows how to configure a SAV group with one IPv6 prefixes and one IPv4 prefixes:

```
Router(config)# cable source-verify group sav1
Router(config)# prefix 10.16.0.0/12
Router(config)# prefix 10::/12
Router(config)# exit
```

**Related Commands**

| Command                                      | Description                                      |
|----------------------------------------------|--------------------------------------------------|
| <b>cable source-verify enable-sav-static</b> | Enables SAV prefix processing.                   |
| <b>prefix</b>                                | Configures IPv4 or IPv6 prefixes in a SAV group. |

# cable source-verify leasequery-filter downstream

To control the number of Dynamic Host Configuration Protocol (DHCP) LEASEQUERY request messages that are sent for unknown IP addresses on all cable downstream interfaces on the Cisco Cable Modem Termination System (CMTS) router, use the **cable source-verify leasequery-filter downstream** command in global configuration mode. To stop the filtering of DHCP lease queries, use the **no** form of this command.

**cable source-verify leasequery-filter downstream** *threshold interval*

**no cable source-verify leasequery-filter downstream**

## Syntax Description

|                  |                                                                                                                                  |
|------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <i>threshold</i> | Maximum number of DHCP lease queries allowed per SID for each <i>interval</i> period. The valid range is 0 to 255 lease queries. |
| <i>interval</i>  | Time period, in seconds, over which lease queries should be monitored. The valid range is 1 to 10 seconds.                       |

## Command Default

Filtering of DHCP lease queries is disabled.

## Command Modes

Global configuration

## Command History

| Release                    | Modification                                                                                                                |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1d, 12.2(15)BC2b | This command was introduced for the Cisco uBR7100 series, Cisco uBR7246VXR, and Cisco uBR10012 universal broadband routers. |

## Usage Guidelines

When the **cable source-verify dhcp** and **no cable arp** commands are configured on a cable interface, the Cisco CMTS router sends a DHCP LEASEQUERY request to the DHCP server to verify unknown IP addresses that are found in packets to and from customer premises equipment (CPE) devices that are using the cable modems on the cable interface. The DHCP server returns a DHCP ACK message with the MAC address of the CPE device that has been assigned this IP address, if any. The router can then verify that this CPE device is authorized to use this IP address, which prevents users from assigning unauthorized IP addresses to their CPE devices.

Problems can occur, though, when viruses, denial of service (DoS) attacks, and theft-of-service attacks scan ranges of IP addresses, in an attempt to find unused addresses. This type of activity can generate a large volume of DHCP LEASEQUERY requests, which can result in high CPU utilization and a lack of available bandwidth for other customers.

To prevent such a large volume of LEASEQUERY requests on all downstreams in the Cisco CMTS router, use the **cable source-verify leasequery-filter downstream** command. After configuring this command, the Cisco CMTS allows only a certain number of DHCP LEASEQUERY requests in the downstream direction within each interval time period.

For example, the **cable source-verify leasequery-filter downstream 5 10** command configures the router so that it allows a maximum of 5 DHCP LEASEQUERY requests every 10 seconds for each SID on the downstream direction. This command applies to all downstream cable interfaces in the router.

**Note**

The **cable source-verify leasequery-filter downstream** command enables DHCP lease query filtering on all downstreams, but the actual filtering does not begin until the **cable source-verify dhcp** command and the **no cable arp** command are configured on a particular downstream. You can configure these commands on either the downstream's main interface, or on a subinterface for the downstream. If these commands are configured on a subinterface, however, the lease query filtering occurs only for cable modems using that subinterface.

**Tip**

Use the **cable source-verify leasequery-filter upstream** command to filter DHCP LEASEQUERY requests in the upstream direction.

**Examples**

The following example shows how to configure the Cisco CMTS router so that it allows a maximum of 10 DHCP lease query requests per SID over each five-second interval on all downstream cable interfaces. This example also shows the configuration of **cable source-verify dhcp** and **no cable arp** commands on a cable interface, which are required to use this feature.

```
Router# configure terminal
Router(config)# cable source-verify leasequery-filter downstream 10 5
Router(config)# interface cable 5/1/0
Router(config-if)# cable source-verify dhcp
Router(config-if)# no cable arp
Router(config-if)#
```

**Related Commands**

| Command                                               | Description                                                                                                                        |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable arp</b>                                      | Activates the cable Address Resolution Protocol (ARP).                                                                             |
| <b>cable arp filter</b>                               | Controls the number of ARP requests and replies that can be forwarded over a cable interface.                                      |
| <b>cable source-verify</b>                            | Enables verification of IP addresses for cable modems (CMs) and CPE devices on the upstream.                                       |
| <b>cable source-verify leasequery-filter upstream</b> | Controls the number of DHCP lease query messages that are sent for unknown IP addresses per each service ID (SID) on an upstream.  |
| <b>show cable leasequery-filter</b>                   | Displays the number of DHCP lease query messages that have been filtered for all cable modems or for a particular cable interface. |

# cable source-verify leasequery-filter upstream

To control the number of Dynamic Host Configuration Protocol (DHCP) LEASEQUERY request messages that are sent for unknown IP addresses per each service ID (SID) on an upstream, use the **cable source-verify leasequery-filter upstream** command in cable interface configuration mode. To disable the filtering of DHCP lease queries, use the **no** form of this command.

**cable source-verify leasequery-filter upstream** *threshold interval*

**no cable source-verify leasequery-filter upstream**

|                    |                  |                                                                                                                                 |
|--------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>threshold</i> | Maximum number of DHCP lease queries allowed per SID for each <i>interval</i> period. The valid range is 0 to 20 lease queries. |
|                    | <i>interval</i>  | Time period, in seconds, over which lease queries should be monitored. The valid range is 1 to 5 seconds.                       |

|          |                                              |
|----------|----------------------------------------------|
| Defaults | Filtering of DHCP lease queries is disabled. |
|----------|----------------------------------------------|

|               |                                                |
|---------------|------------------------------------------------|
| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|

| Command History | Release                       | Modification                                                                                                                |
|-----------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC1d,<br>12.2(15)BC2b | This command was introduced for the Cisco uBR7100 series, Cisco uBR7246VXR, and Cisco uBR10012 universal broadband routers. |

**Usage Guidelines**

When the **cable source-verify dhcp** and **no cable arp** commands are configured on a cable interface, the Cisco Cable Modem Termination System (CMTS) router sends a DHCP LEASEQUERY request to the DHCP server to verify unknown IP addresses that are found in packets to and from customer premises equipment (CPE) devices that are using the cable modems on the cable interface. The DHCP server returns a DHCP ACK message with the MAC address of the CPE device that has been assigned this IP address, if any. The router can then verify that this CPE device is authorized to use this IP address, which prevents users from assigning unauthorized IP addresses to their CPE devices.

Problems can occur, though, when viruses, denial of service (DoS) attacks, and theft-of-service attacks scan ranges of IP addresses, in an attempt to find unused addresses. This type of activity can generate a large volume of DHCP LEASEQUERY requests, which can result in high CPU utilization and a lack of available bandwidth for other customers.

To prevent such a large volume of LEASEQUERY requests on the upstreams on a cable interface, use the **cable source-verify leasequery-filter upstream** command. After configuring this command, the Cisco CMTS allows only a certain number of DHCP LEASEQUERY requests in the upstream direction within each interval time period.

For example, the **cable source-verify leasequery-filter upstream 5 5** command configures the router so that it allows a maximum of 5 DHCP LEASEQUERY requests every 5 seconds for each SID on the upstream direction. This command applies to all upstreams on the cable interface.

**Note**

The **cable source-verify leasequery-filter upstream** command enables DHCP lease query filtering on all upstreams on a cable interface, but the actual filtering does not begin until the **cable source-verify dhcp** command and the **no cable arp** command are configured on the upstream's associated downstream interface. You can configure these commands on either the downstream's main interface, or on a subinterface for the downstream. If these commands are configured on a subinterface, however, the lease query filtering occurs only for cable modems using that subinterface.

**Note**

If using cable interface bundling, configure the **cable source-verify leasequery-filter upstream** command on all master and slave interfaces.

**Tip**

Use the **cable source-verify leasequery-filter downstream** command to filter DHCP LEASEQUERY requests in the downstream direction.

**Examples**

The following example shows how to configure the Cisco CMTS router so that it allows a maximum of five DHCP lease query requests per SID over each two-second interval on all upstreams on a particular cable interface. This example also shows the configuration of **cable source-verify dhcp** and **no cable arp** commands on the cable interface, which are required to use this feature.

```
Router# configure terminal
Router(config)# interface cable 6/0
Router(config-if)# cable source-verify dhcp
Router(config-if)# cable source-verify leasequery-filter upstream 5 2
Router(config-if)# no cable arp
Router(config-if)#
```

**Related Commands**

| Command                                                 | Description                                                                                                                                          |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable arp</b>                                        | Activates the cable Address Resolution Protocol (ARP).                                                                                               |
| <b>cable arp filter</b>                                 | Controls the number of ARP requests and replies that can be forwarded over a cable interface.                                                        |
| <b>cable source-verify</b>                              | Enables verification of IP addresses for cable modems (CMs) and CPE devices on the upstream.                                                         |
| <b>cable source-verify leasequery-filter downstream</b> | Controls the number of DHCP lease query messages that are sent for unknown IP addresses on all cable downstream interfaces on the Cisco CMTS router. |
| <b>show cable leasequery-filter</b>                     | Displays the number of DHCP lease query messages that have been filtered for all cable modems or for a particular cable interface.                   |

# cable spectrum-group (global)

To create and configure a spectrum group, use the **cable spectrum-group** command in global configuration mode. To disable this spectrum group, use the **no** form of this command.

**cable spectrum-group** *group-number* [**time** *day hh:mm:ss*] **frequency** *up-freq-hz* [*pwr-lvl-dbmV*]

**cable spectrum-group** *group-number* [**time** *day hh:mm:ss*] **band** *up-freq1-hz up-freq2-hz* [*pwr-lvl-dbmV*]

**no cable spectrum-group** *group-number*

| Syntax Description                         |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group-number</i>                        |  | Specifies the spectrum group for which you are specifying a parameter value or specifies the number of the spectrum group you wish to remove from your router configuration. Valid range is from 1 to 32, or from 1 to 40, depending on the Cisco IOS software release.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>time</b> <i>day hh:mm:ss</i>            |  | (Optional) for scheduled spectrum groups, enter the day of the week ( <b>Sun—Sat</b> ) and the time of day that the frequency and input power level should change.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>frequency</b> <i>up-freq-hz</i>         |  | Specifies a center frequency for the upstream group. The valid range is 5,000,000 Hz to 42,000,000 Hz (DOCSIS), 55,000,000 Hz (Japan), or 65,000,000 (EuroDOCSIS).<br><br><b>Note</b> You can enter this command multiple times for the same spectrum group to create a group of individual frequencies to be used for frequency hopping.                                                                                                                                                                                                                                                                                                |
| <b>band</b> <i>up-freq1-hz up-freq2-hz</i> |  | Specifies a range of center frequencies the Cisco CMTS can scan to find an acceptable channel to which the spectrum group may hop. The valid range for <i>up-freq1-hz</i> is 5,000,000 Hz to 42,000,000 Hz (DOCSIS), 55,000,000 Hz (Japan), or 65,000,000 (EuroDOCSIS), but <i>up-freq2-hz</i> must be greater than <i>up-freq1-hz</i> .<br><br><b>Note</b> When creating spectrum groups for cable line cards that support Advanced Spectrum Management (Cisco uBR10-MC16S, uBR10-MC16U/X, uBR10-MC28U/X, and uBR10-MC5X20S/U), use the <b>band</b> option. The <b>frequency</b> option is not supported for these types of line cards. |
| <i>pwr-lvl-dbmV</i>                        |  | (Optional) Specifies the nominal input power level. The valid range is -10 to +25 dBmV, with a default of 0 dBmV. Some cable plants might want to change only the input power level, and not the frequency, on a daily time schedule.                                                                                                                                                                                                                                                                                                                                                                                                    |

**Command Default** If not specified, the group is set for a nominal input power level of 0 dBmV and the group is not scheduled for automatic frequency or power changes.

**Command Modes** Global configuration



## Command History

| Release                                 | Modification                                                                                                                                           |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA                                 | This command was introduced.                                                                                                                           |
| 12.0(7)XR2                              | The <b>band</b> parameter for this command was added to enable frequency range scanning capabilities in the Cisco uBR-MC16S cable interface line card. |
| 12.0(13)SC,<br>12.1(4)EC,<br>12.2(4)BC1 | The allowable frequency range was increased to 65 MHz to support the EuroDOCSIS frequency range of the Cisco uBR-MC16E cable interface line card.      |
| 12.2(15)BC2                             | The maximum number of spectrum groups was increased from 32 to 40 groups per router.                                                                   |

## Usage Guidelines

Frequency agility is configured and activated using spectrum groups that are controlled by the spectrum manager. You can create from 1 to 32, or from 1 to 40, spectrum groups for each cable modem card upstream port, depending on the Cisco IOS software release.

To create spectrum groups, specify a list of upstream frequencies and nominal power levels that each spectrum group can use when an upstream frequency change is necessary. Each spectrum group should have its own list of upstream frequencies. At 1.6 MHz, the valid range is –10 dBmV to 25 dBmV. The power level value should be changed only if you want to change only the power level as part of spectrum management. The standard power level is 0 dBmV.

The **cable spectrum-group** command sets the center frequency for the upstream, but the total frequency bandwidth that is actually used depends on the channel width. [Table 0-16](#) shows the possible center frequencies for each channel width, for both DOCSIS and EuroDOCSIS cable interfaces.

**Table 0-16 Allowable Center Frequencies**

| Channel Width (MHz) | Center Frequency (MHz)<br>DOCSIS (5 to 42 MHz) | Center Frequency (MHz)<br>EuroDOCSIS (5 to 65 MHz) |
|---------------------|------------------------------------------------|----------------------------------------------------|
| 200,000             | 5.1 to 41.9                                    | 5.1 to 64.9                                        |
| 400,000             | 5.2 to 41.8                                    | 5.2 to 64.8                                        |
| 800,000             | 5.4 to 41.6                                    | 5.4 to 64.6                                        |
| 1,600,000           | 5.8 to 41.2                                    | 5.8 to 64.2                                        |
| 3,200,000           | 6.6 to 40.4                                    | 6.6 to 63.4                                        |

The allowable range for the upstream channel frequency depends on the cable interface line card and Cisco IOS software release being used. See [Table 2-11](#) for the currently supported values.

**Table 0-17 Allowable Frequency Range for the cable upstream frequency Command**

| Frequency Range | Supported Cable Interfaces     | Minimum Cisco IOS Releases                |
|-----------------|--------------------------------|-------------------------------------------|
| 5 to 42 MHz     | All supported cable interfaces | All releases supported for the Cisco CMTS |

**Table 0-17 Allowable Frequency Range for the cable upstream frequency Command**

| Frequency Range | Supported Cable Interfaces                                                                          | Minimum Cisco IOS Releases                              |
|-----------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| 5 to 55 MHz     | Cisco uBR-MC16U/X and Cisco uBR-MC28U/X, when operating with extended frequencies for Japanese mode | Cisco IOS Release 12.2(15)BC2                           |
| 5 to 65 MHz     | Cisco uBR-MC16E, Cisco uBR7111E and Cisco uBR7114E routers                                          | Cisco IOS Release 12.0(13)SC, 12.1(4)EC, and 12.2(4)BC1 |

**Note**

If both an Cisco uBR-MC16E cable interface line card and a Cisco uBR-MC16C or a Cisco uBR-MC16S cable interface line card are present in the chassis, a spectrum group in the 42-MHz to 65-MHz range should not be assigned.

**Tip**

Cisco cable interface line cards always program the upstream's center frequency in 16 KHz increments, and this is the frequency displayed by the **show controller cable upstream** command. For example, if you use the **cable upstream frequency** command to specify a center frequency of 27 MHz (**cable upstream x frequency 27000000**), the actual center frequency will be 27.008 MHz, which is the next highest 16 KHz boundary.

You must repeat this command for each frequency or power level that you want to add to a spectrum group's list of valid values.

After you have created one or more spectrum groups for your cable network, you can add characteristics to them, providing you with more definitive control over frequency usage and frequency hopping.

The cable interface does not operate until you either create and configure a spectrum group or set a fixed upstream frequency. See the **cable upstream channel-width** command.

**Examples**

The following example shows how to configure spectrum group 1 with an upstream frequency of 6,500,000 Hz and a default power level of 0 dBmV:

```
Router(config)# cable spectrum-group 1 frequency 6500000
```

The following example shows how to add the upstream frequency 7,000,000 Hz to the list of valid frequencies with a default power level of 0 dBmV for spectrum group 1:

```
Router(config)# cable spectrum-group 1 frequency 7000000
```

The following example shows how to configure spectrum group 2 with an upstream frequency 7,500,000 Hz and change the power level to 5 dBmV:

```
Router(config)# cable spectrum-group 2 frequency 7500000 5
```

The following example shows how to configure spectrum group 3 with an upstream band of 12,000,000 to 18,000,000 Hz and default power level of 0 dBmV:

```
Router(config)# cable spectrum-group 3 band 12000000 18000000
```

The following example shows how to add the upstream band 20,000,000 to 24,000,000 Hz to the list of valid bands with a change in the power level of 13 dBmV for spectrum group 3:

```
Router(config)# cable spectrum-group 3 band 20000000 24000000 13
```

The following example shows how to configure a continuous band between 5,000,004 and 40,000,000 Hz for scheduled spectrum group 4 with a default power level of 0 dBmV. The spectrum group will be available to the spectrum group starting at 12:00 p.m. local time each Monday:

```
Router(config)# cable spectrum-group 4 time Monday 12:00:00 band 5000004 40000000
```

The following example shows how to add the upstream frequency 9,500,000 Hz to the list of valid frequencies and change the nominal power level to 5 dBmV. The spectrum manager adjusts frequencies and power levels on this group at 2:00 a.m. local time each day:

```
Router(config)# cable spectrum-group 3 time 02:00:00 frequency 9500000 5
```

The following example shows how to remove a specified spectrum group from your configuration:

```
Router(config)# no cable spectrum-group 3
Router(config)#
```

## Related Commands

| Command                                   | Description                                                                                                                                                                |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>           | Configures preset modulation profiles that you can apply to one or more upstream cable interfaces when you identify and configure spectrum groups.                         |
| <b>cable spectrum-group hop period</b>    | Sets the minimum frequency-hop interval for a cable spectrum group.                                                                                                        |
| <b>cable spectrum-group hop threshold</b> | Specifies a hop threshold for a cable spectrum group.                                                                                                                      |
| <b>cable spectrum-group shared</b>        | Specifies the upstream ports in a spectrum group can share the same upstream frequency.                                                                                    |
| <b>cable upstream frequency</b>           | Specifies that the upstream should either be set to a specific center frequency or be set dynamically.                                                                     |
| <b>cable upstream power-level</b>         | Specifies the upstream cable interface receive power level in dBmV.                                                                                                        |
| <b>cable upstream shutdown</b>            | Activates or shuts down a specified upstream cable interface.                                                                                                              |
| <b>cable upstream hopping blind</b>       | Disengages the advanced spectrum management features of the Cisco uBR-MC16S and Cisco uBR-MC5X20S cable interface line cards by enabling blind frequency hopping behavior. |
| <b>show controllers cable</b>             | Displays information about the cable interface, including the upstream center frequency.                                                                                   |

# cable spectrum-group (interface)

To assign a default spectrum group to all of the upstreams on a cable interface, use the **cable spectrum-group** command in interface configuration mode. To remove the spectrum groups from the upstreams, use the **no** form of this command.

```
cable spectrum-group group-number

no cable spectrum-group group-number
```

|                    |                                                                                                                                                                                                                                     |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>group-number</i> Specifies the spectrum group that should be used as the default group for the upstreams on this cable interface. The valid range is from 1 to 32, or from 1 to 40, depending on the Cisco IOS software release. |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                |
|-----------------|--------------------------------|
| Command Default | No default behavior or values. |
|-----------------|--------------------------------|

|               |                         |
|---------------|-------------------------|
| Command Modes | Interface configuration |
|---------------|-------------------------|

| Command History | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>11.3 NA</td><td>This command was introduced.</td></tr><tr><td>12.2(15)BC2</td><td>The maximum number of spectrum groups was increased from 32 to 40 groups per router.</td></tr></table> | Release | Modification | 11.3 NA | This command was introduced. | 12.2(15)BC2 | The maximum number of spectrum groups was increased from 32 to 40 groups per router. |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|---------|------------------------------|-------------|--------------------------------------------------------------------------------------|
| Release         | Modification                                                                                                                                                                                                                                          |         |              |         |                              |             |                                                                                      |
| 11.3 NA         | This command was introduced.                                                                                                                                                                                                                          |         |              |         |                              |             |                                                                                      |
| 12.2(15)BC2     | The maximum number of spectrum groups was increased from 32 to 40 groups per router.                                                                                                                                                                  |         |              |         |                              |             |                                                                                      |

**Usage Guidelines** This command assigns a default spectrum group to all of the upstreams on the cable interface. All upstreams on the interface use this spectrum group unless you override this configuration, using one of the following commands:

- To assign a different spectrum group to a particular upstream, use the **cable upstream spectrum-group** command.
- To assign a new frequency to a particular upstream, use the **cable upstream frequency** command.

These two commands override the **cable spectrum-group** command for the particular upstreams to which they are applied. The remaining upstreams in the interface, however, continue to use the default configuration that is specified by the **cable spectrum-group** command.



Tip

You must first create and configure the spectrum groups before you can assign them to an interface. To create and configure spectrum groups, use the set of **cable spectrum-group** commands that are available in global configuration mode.

|          |                                                                                                                                                                                     |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to assign spectrum group 1 to all of the upstreams on the cable interface in slot 3/0:</p> <pre>Router(config)# <b>interface cable 3/0</b></pre> |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router(config-if)# cable spectrum-group 1
Router(config-if)# exit
Router(config)#
```

**Related Commands**

| Command                                            | Description                                                                                                                                                                |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>                    | Configures preset modulation profiles that you can apply to one or more upstream cable interfaces when you identify and configure spectrum groups.                         |
| <b>cable spectrum-group (global configuration)</b> | Creates and configures a spectrum group.                                                                                                                                   |
| <b>cable spectrum-group hop period</b>             | Sets the minimum frequency-hop interval for a cable spectrum group.                                                                                                        |
| <b>cable spectrum-group hop threshold</b>          | Specifies a hop threshold for a cable spectrum group.                                                                                                                      |
| <b>cable spectrum-group shared</b>                 | Specifies the upstream ports in a spectrum group can share the same upstream frequency.                                                                                    |
| <b>cable upstream hopping blind</b>                | Disengages the advanced spectrum management features of the Cisco uBR-MC16S and Cisco uBR-MC5X20S cable interface line cards by enabling blind frequency hopping behavior. |
| <b>cable upstream spectrum-group</b>               | Assigns a spectrum group to an individual upstream on a cable interface line card.                                                                                         |

# cable spectrum-group hop period

To change the minimum time between frequency hops, use the **cable spectrum-group hop period** command in global configuration mode. To reset the frequency hop interval for this spectrum group to its default value, use the **no** form of this command.

**cable spectrum-group** *groupnum* **hop period** *seconds*

**no cable spectrum-group** *groupnum* **hop period**

## Syntax Description

|                 |                                                                                                                                                                                                      |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>groupnum</i> | Spectrum group number. Valid values are from 1 to 32, or from 1 to 40, depending on the Cisco IOS software release.                                                                                  |
| <i>seconds</i>  | Specifies the frequency-hop time period in seconds. Valid values are from 1 to 3600 seconds (before Cisco IOS Release 12.2(8)BC1), or from 1 to 300 seconds (Cisco IOS Release 12.2(8)BC1 or later). |

## Command Default

Before Cisco IOS Release 12.2(15)BC1: 25 seconds  
Cisco IOS Release 12.2(15)BC1 and later releases: 20 seconds when N+1 HCCP redundancy is not configured, and 15 seconds when N+1 HCCP redundancy is configured on the cable interface

## Command Modes

Global configuration

## Command History

| Release     | Modification                                                                                                                                                                                                 |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1 T      | This command was introduced.                                                                                                                                                                                 |
| 12.1(7)CX1  | The default <b>hop period</b> was changed from 300 seconds to 25 seconds to accommodate the new spectrum management features for the Cisco uBR-MC16S spectrum management card.                               |
| 12.2(8)BC1  | The maximum frequency-hop time period was changed from 3600 to 300 seconds.                                                                                                                                  |
| 12.2(15)BC1 | The default <b>hop period</b> was changed from 25 seconds to 20 seconds when N+1 HCCP redundancy is not configured on the cable interface, and changed to 15 seconds when N+1 HCCP redundancy is configured. |
| 12.2(15)BC2 | The maximum number of spectrum groups was increased from 32 to 40 groups per router.                                                                                                                         |

## Usage Guidelines

The **cable spectrum-group hop period** command defines the minimum amount of time that must pass between upstream frequency hops. If ingress noise becomes excessive on a particular upstream, you can set this time period to a smaller value, so as to allow frequency hopping to continue more rapidly until a clear channel is found. Conversely, if the problem appears to be a transient condition, such as a defective CM generating a large volume of errored packets, this time period can be increased to a larger value, so as to avoid excessive frequency hopping by allowing more time between frequency hops.

On the Cisco uBR-MC1xC cards, the maximum recommended hop period is 20 seconds. On the Cisco uBR-MC16S and Cisco uBR-MC5X20S/U cards, the minimum recommended hop period is 25 seconds and the maximum recommended hop period is 35 seconds.

In Cisco IOS Release 12.2(15)BC2, the Cisco CMTS adaptively increases the hop period from the user-defined value to the maximum value (300 seconds) whenever an upstream does not currently have any CMs ranging on it, so as to avoid unnecessary frequency hopping. The user-defined value is restored when a CM starts ranging on the upstream.

**Note**

The hop period should be set to at least 25 seconds on the Cisco uBR-MC16S and Cisco uBR-MC5X20S/U cards so that transient network problems that are unrelated to ingress noise do not generate unnecessary frequency hops.

**Examples**

The following example shows how to change the minimum frequency-hop interval to 60 seconds. This means that frequency hops for this spectrum group cannot occur more quickly than once every 60 seconds, even if other characteristics, such as exceeding the CNR or FEC threshold values, would normally trigger the hop.

```
Router# configure terminal
Router(config)# cable spectrum-group 1 hop period 60
Router(config)#
```

**Related Commands**

| Command                                   | Description                                                                                                                  |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>           | Creates a cable modulation profile.                                                                                          |
| <b>cable spectrum-group hop threshold</b> | Specifies a hop threshold for a cable spectrum group.                                                                        |
| <b>cable upstream channel-width</b>       | Configures an upstream for a range of allowable channel widths.                                                              |
| <b>cable upstream modulation-profile</b>  | Configures an upstream for one modulation profile (static profile) or two modulation profiles (Dynamic Upstream Modulation). |
| <b>show cable hop</b>                     | Displays the current hop period and threshold for an upstream, along with other statistics.                                  |

# cable spectrum-group hop threshold

To specify a frequency hop threshold for a spectrum group, use the **cable spectrum-group hop threshold** command in global configuration mode. To delete the hop threshold for this spectrum group, use the **no** form of this command.

**cable spectrum-group** *groupnum* **hop threshold** [*percent*]

**no cable spectrum-group** *groupnum* **hop threshold**

## Syntax Description

|                 |                                                                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>groupnum</i> | Spectrum group number. Valid values are from 1 to 32, or from 1 to 40, depending on the Cisco IOS software release.                                   |
| <i>percent</i>  | (Optional) Specifies the frequency hop threshold as a percentage of station maintenance messages that are lost. Valid range is from 1 to 100 percent. |

## Command Default

20 percent

## Command Modes

Global configuration

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1 T      | This command was introduced.                                                                                                                                                      |
| 12.1(7)CX1  | The default <b>hop threshold</b> was changed from 100 percent to 20 percent to accommodate the new spectrum management features for the Cisco uBR-MC16S spectrum management card. |
| 12.2(4)BC1  | Support for this command was added to the Release 12.2 BC train.                                                                                                                  |
| 12.2(15)BC2 | The maximum number of spectrum groups was increased from 32 to 40 groups per router.                                                                                              |

## Usage Guidelines

The Cisco CMTS sends a station maintenance message to each CM at least once every 25 to 30 seconds. If a CM does not respond to a station maintenance message within that time period, the CMTS then resends station maintenance messages at a faster rate (typically one second apart) in an attempt to restore connectivity with the CM.

Station maintenance messages can be lost because CMs have lost connectivity with the CMTS, or because ingress noise and other factors are causing dropped and errored packets. Downstream noise can also affect the delivery of station maintenance messages. When a user-configurable percentage of station maintenance messages are lost, the CMTS hops to a new upstream frequency to improve connectivity and sends out an Upstream Channel Descriptor (UCD) update to the CMs to inform them of the change.

The optimal hop threshold value depends on several factors, including the quality of the upstream return path and the number of CMs on the upstream. In addition, the hop threshold works together with the hop period so that transient network problems do not generate an unnecessary number of frequency hops. Ideally, the hop threshold should be set low enough so that the frequency hop can occur before a significant number of CMs go offline, but not so low that it generates frequency hops that are not needed.



For example, if the hop threshold is at its default of 20 percent and an upstream has 100 active CMs, a power outage that affected 20 CMs would usually cause a frequency hop since this is a 20 percent loss of CMs, which in turn would be responsible for at least 20 percent loss of station maintenance messages. But in this situation, the frequency hop would be unneeded because changing the upstream frequency could not correct the original problem (the power outage). If this were a common situation on this upstream, the network administrator might increase the hop threshold so that the repeated power outages would not generate unneeded frequency hops.

If, on the other hand, the power outage affected only 10 CMs, a frequency hop would not occur unless another factor, such as ingress noise, created a sufficient loss of station maintenance messages to reach the 20 percent threshold. In this situation, the default threshold of 20 percent might be sufficient.

Downstream problems can also generate frequency hops. For example, if 20 CMs were on a particularly noisy downstream, over time they could miss a sufficient number of station maintenance messages to generate a frequency hop. The network administrator could increase the hop threshold to limit the possibility of frequency hops due to downstream impairments.

Also, faulty CMs could generate a frequency hop under certain conditions. For example, if a number of faulty CMs generated a large number of uncorrectable forward error correction (FEC) errors or otherwise missed 50 to 60 percent of their station maintenance messages, without actually going offline, over time they could miss a sufficient number of station maintenance messages to cause a frequency hop or modulation change. The network administrator could increase the hop threshold to prevent the CMTS from generating a frequency hop or modulation change for problems such as these, which are unrelated to actual noise on the upstream.

**Note**

If a previous frequency hop had already occurred within the user-configurable hop period, the CMTS will not immediately frequency hop. Instead, the CMTS would wait until the hop period expires, and if the percentage of station maintenance messages still exceeds the hop threshold, the CMTS would perform another frequency hop.

**Tip**

When an upstream has 25 or fewer CMs (which is typical with lab and test environments), the CMTS increases the rate at which it sends station maintenance messages to the CMs. This higher polling rate, along with the small number of CMs, means that frequency hopping can occur more quickly than with a normally loaded upstream, especially when a small number of CMs are powered down or generate noisy traffic.

**Note**

The DOCSIS specification states that when a CM misses 16 sequential station maintenance messages, the CMTS should consider the CM offline and should stop sending station maintenance messages to that CM. The CM must then reregister with the CMTS to resume connectivity.

**Examples**

The following example shows how to set the threshold that triggers frequency hop to 25 percent of station maintenance messages on the upstream that is assigned to spectrum-group 4:

```
Router# configure terminal
Router(config)# cable spectrum-group 4 hop threshold 25
Router(config)#
```

| Related Commands | Command                                  | Description                                                                                                                  |
|------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable modulation-profile</b>          | Creates a cable modulation profile.                                                                                          |
|                  | <b>cable spectrum-group hop period</b>   | Sets the minimum frequency-hop interval for a cable spectrum group.                                                          |
|                  | <b>cable upstream channel-width</b>      | Configures an upstream for a range of allowable channel widths.                                                              |
|                  | <b>cable upstream modulation-profile</b> | Configures an upstream for one modulation profile (static profile) or two modulation profiles (Dynamic Upstream Modulation). |
|                  | <b>show cable hop</b>                    | Displays the current hop period and threshold for an upstream, along with other statistics.                                  |

# cable spectrum-group shared



## Note

Effective with Cisco IOS Release 12.2(33)SCG, the **cable spectrum-group shared** command is not available in Cisco IOS software.

To specify that the upstream ports in a spectrum group share the same upstream frequency, use the **cable spectrum-group shared** command in global configuration mode. To delete this specification, use the **no** form of this command.

**cable spectrum-group** *groupnum* **shared**

**no cable spectrum-group** *groupnum* **shared**

## Syntax Description

*groupnum* Spectrum group number. Valid values are from 1 to 32, or from 1 to 40, depending on the Cisco IOS software release.

## Command Default

Upstream port frequency is the same for all ports in the spectrum group.

## Command Modes

Global configuration

## Command History

| Release     | Modification                                                                                      |
|-------------|---------------------------------------------------------------------------------------------------|
| 12.1 T      | This command was introduced.                                                                      |
| 12.2(11)BC3 | Support was added for this command on the Cisco uBR-LCP2-MC16S card on the Cisco uBR10012 router. |
| 12.2(15)BC2 | The maximum number of spectrum groups was increased from 32 to 40 groups per router.              |
| 12.2(33)SCG | This command was removed.                                                                         |

## Usage Guidelines

Because this command forces upstream ports to use the same spectrum, you must ensure that you do not configure spectrum groups that have overlapping frequencies. To use shared spectrum groups, each group must be using a discrete set of frequencies.



## Caution

Depending on the frequencies being used, and how cable modems are distributed across those frequencies and among spectrum groups, switching from a group from shared to non-shared, or from non-shared to shared, could cause CMs in the spectrum group to go offline and begin reranging procedures. You should therefore use this command only during regularly schedule maintenance times, so that a minimum number of online customers are affected.



## Note

This command does not enable any sort of load balancing on the shared upstreams.

**Examples**

The following example shows how to specify that all the upstream ports for spectrum group 4 share the same upstream frequency, and that these upstream frequencies are not assigned to other upstream interfaces:

```
Router(config)# cable spectrum-group 4 shared
Router(config)#
```

**Related Commands**

| Command                                            | Description                                                                                                                                                                |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>                    | Configures preset modulation profiles that you can apply to one or more upstream cable interfaces when you identify and configure spectrum groups.                         |
| <b>cable spectrum-group (global configuration)</b> | Creates a spectrum group of one or more frequencies for an upstream.                                                                                                       |
| <b>cable spectrum-group hop period</b>             | Sets the minimum frequency-hop interval for a cable spectrum group.                                                                                                        |
| <b>cable spectrum-group hop threshold</b>          | Specifies a hop threshold for a cable spectrum group.                                                                                                                      |
| <b>cable upstream hopping blind</b>                | Disengages the advanced spectrum management features of the Cisco uBR-MC16S and Cisco uBR-MC5X20S cable interface line cards by enabling blind frequency hopping behavior. |
| <b>show controllers cable</b>                      | Displays information about the cable interface, including the upstream center frequency.                                                                                   |

# cable submgmt default

To set the default values for attributes in the Subscriber Management MIB (DOCS-SUBMGT-MIB), and to enable Cisco Static CPE Override on the Cisco CMTS, use the **cable submgmt default** global configuration command. To restore the original defaults, use the **no** form of this command.

**cable submgmt default** [**active** | **learnable** | **max-cpe** *cpe-num*]

**no cable submgmt default** [**active** | **learnable** | **max-cpe** *cpe-num*]

**cable submgmt default filter-group** {**cm** | **cpe** | **mta** | **stb** | **ps**} {**downstream** | **upstream**} *group-id*

**no cable submgmt default filter-group** {**cm** | **cpe** | **mta** | **stb** | **ps**} {**downstream** | **upstream**} *group-id*

| Syntax Description            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>no</b>                     |  | When used with the <b>active</b> and <b>learnable</b> options, the <b>no</b> form of the command sets the default attributes to false. When used with the <b>max-cpe</b> and <b>filter-group</b> options, the <b>no</b> form of the command sets the attribute to 0.                                                                                                                                                                                 |
| <b>active</b>                 |  | (Optional) Sets the docsSubMgtCpeActiveDefault attribute, which controls whether the CMTS manages the CPE devices for a particular CM—when set to TRUE, the CMTS enforces the MAX-CPE value and the implemented filters. The <b>no cable submgmt default active</b> command sets the default value to FALSE (the original default), which turns off CPE management at the CMTS.                                                                      |
| <b>learnable</b>              |  | (Optional) Sets the docsSubMgtCpeLearnableDefault attribute, which controls whether the CMTS learns the CPE IP addresses for a particular CM—when set to TRUE (the original default), the CMTS learns IP addresses up to the MAX-CPE value. The <b>no cable submgmt default learnable</b> command sets the default value to FALSE, which means that the IP address for each allowable CPE device must be specified in the DOCSIS configuration file. |
| <b>max-cpe</b> <i>cpe-num</i> |  | (Optional) Sets the docsSubMgtCpeMaxIpDefault attribute, which specifies the default number of simultaneous IP addresses (CPE devices) permitted for the CM. The possible range is 0 to 1024, where 0 specifies that all CPE traffic from the CM is dropped. The default is 16.                                                                                                                                                                      |
| <b>filter-group</b>           |  | Specifies a filter group, which can be applied to either upstream or downstream traffic for either a CM or its CPE devices.                                                                                                                                                                                                                                                                                                                          |
| <b>cm</b>                     |  | Specifies that the filter group applies to traffic to or from a CM.                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>cpe</b>                    |  | Specifies that the filter group applies to traffic to or from a CPE device.                                                                                                                                                                                                                                                                                                                                                                          |
| <b>mta</b>                    |  | Specifies that the filter group applies to traffic to or from a multimedia terminal adaptor (mta.)                                                                                                                                                                                                                                                                                                                                                   |
| <b>stb</b>                    |  | Specifies that the filter group applies to traffic to or from a Set-Top Box (stb.)                                                                                                                                                                                                                                                                                                                                                                   |
| <b>ps</b>                     |  | Specifies that the filter group applies to traffic to or from a portal server (ps.)                                                                                                                                                                                                                                                                                                                                                                  |
| <b>downstream</b>             |  | Specifies that the filter group applies to the downstream traffic that is going to the specified CM or CPE device.                                                                                                                                                                                                                                                                                                                                   |

|                 |                                                                                                                                                                                                                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream</b> | Specifies that the filter group applies to the upstream traffic that is coming from the specified CM or CPE device.                                                                                                                                                                          |
| <i>group-id</i> | Specifies the filter group ID (0 to 254) to be applied for the CM or CPE, downstream or upstream filter. This ID references the filter indexes that are used for rows in the docsSubMgtPktFilterTable. A value of 0 indicates that no filtering is used for this particular type of traffic. |

### Command Default

The Subscriber Management MIB defaults to the following default values:

- The **active** parameter defaults to FALSE (the CMTS does not actively manage CPE devices).
- The **learnable** parameter defaults to TRUE (the CMTS learns the IP addresses for CPE devices).
- The **max-cpe** parameter defaults to 16 IP addresses.
- The filter group ID for each type of filter group defaults to 0, which means that no filtering is done on that type of traffic.

### Command Modes

Global configuration (config)

### Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.1(7)CX1  | This command was introduced.                                                                                       |
| 12.3(9a)BC  | This command was integrated into Cisco IOS Release 12.3(9a)BC.                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCB | This command was updated to support MTA, STB, and portal server.                                                   |

### Usage Guidelines

This command enables field technicians to add a temporary CPE device behind the subscriber's cable modem. The temporary CPE device shares the same SID settings as the original CPE device, even though the temporary CPE device has a different MAC address. The original CPE device automatically changes from *dhcp cpe* to *static cpe* in the CMTS host routing tables, and the CPE device continues to receive service with the same SID.

To disable Cisco CMTS Static CPE Override on the Cisco CMTS, use the **no** form of this command. This automatically updates the routing tables and enables the MAC address from the technician's laptop for a future field service connection at a different location. Prior to using this command, the first (existing) DHCP CPE device maintains its DHCP dynamic MAC address behind the cable modem. The SID is assigned to this IP address.

However, by enabling Static CPE override, you gain the following states and options on two CPE devices behind the cable modem.

- The SID definition on the first CPE device is assigned a different static IP address. This enables you to change the existing (dynamic) DHCP IP address to a static IP address without first clearing the DHCP CPE host entries from the Cisco CMTS. The CPE IP state changes from **dhcp** to **static cpe**.
- This static override allows a second CPE device with a second MAC address behind the same cable modem with SID1 to be assigned same IP address as the first CPE device.

**Note**

The second CPE device changes from **dhcp cpe** to **static CPE** in the CMTS host tables.

The DOCSIS 1.1 Subscriber Management MIB (DOCS-SUBMGT-MIB) creates and maintains a number of tables that describe the state of subscriber management for the CMs and CPE devices being serviced by the Cisco CMTS. The CMTS creates rows in these tables for each CM and CPE device when the CM registers with the CMTS, and if the CM does not specify a value for an attribute in this table, the CMTS uses the defaults specified by the **cable submgmt default** command.

**Timesaver**

The DOCS-SUBMGT-MIB MIB contains its own default values for these attributes, and those defaults can be overridden by giving the appropriate SNMP SET commands. The **cable submgmt default** command, however, allows the new defaults to be included in the Cisco IOS configuration file so that the defaults are automatically reconfigured whenever the CMTS reboots or reloads.

**Note**

The **cable submgmt default** command sets only the default value for these attributes. These default values are used only if the CM does not specify other values when it registers with the CMTS. If the CM does specify different values at registration time, those values are used instead of these default values.

The attributes in DOCS-SUBMGT-MIB control how the CMTS manages the CPE devices behind a CM and the filters that are applied to the traffic to and from a particular CM and its CPE devices. The following sections describe the relationship between the different forms of the **cable submgmt default** commands and the attributes in DOCS-SUBMGT-MIB.

## CPE Management

The first form of the **cable submgmt default** command controls the default values for the entries in the docsSubMgtCpeControlTable, which controls how the CMTS manages the CPE devices for each CM:

### **cable submgmt default active**

Sets the docsSubMgtCpeActiveDefault attribute, which is the default value for the docsSubMgtCpeControlActive attribute in docsSubMgtCpeControlTable. This attribute controls whether the CMTS performs CPE management for a particular CM.

- The **cable submgmt default active** command sets the default to TRUE, which specifies that the CMTS is to manage CPE devices by enforcing the MAX-CPE number and the implemented filters.
- The **no cable submgmt default active** command sets the default to FALSE (the default value), which specifies that the CMTS is not to perform CPE management for the particular CM.

### **cable submgmt default learnable**

Sets the docsSubMgtCpeLearnableDefault attribute, which is the default value for the docsSubMgtCpeControlLearnable attribute in docsSubMgtCpeControlTable. This attribute controls whether the CMTS learns the IP addresses for CPE devices behind a particular CM.

- The **cable submgmt default learnable** command sets the default to TRUE (the default value), which specifies that the CMTS is to learn the IP addresses for the CPE devices behind the CM, up to the value specified by the MAX-CPE parameter. The CMTS learns the IP addresses by monitoring the traffic sent by the CPE devices, and the first CPE devices to transmit traffic are the first CPE devices to be learned.
- The **no cable submgmt default learnable** command sets the default to FALSE, which specifies that the CMTS does not learn the IP addresses for the CPE devices behind a particular CM. Instead, the IP addresses for each CM that is to be allowed access must be specified in the DOCSIS configuration file.

**cable submgmt default max-cpe** *cpe-num*

Sets the docsSubMgtCpeMaxIpDefault attribute, which specifies the default value for the docsSubMgtCpeControlMaxCpeIp attribute in docsSubMgtCpeControlTable. This attribute specifies the maximum number of IP addresses that can transmit traffic through a particular CM. The possible range is 0 to 1024, and the original default is 16.

**Note**

The MAX-CPE attribute is used only when the CMTS is actively managing CPE devices for the CM.

## Filter Group Management

The second form of the **cable submgmt default** command controls the default values for the entries in the docsSubMgtCmFilterTable, which assigns the CM to one or more filter groups. A filter group specifies what filters are applied to the traffic going to or coming from each particular CM or CPE device. Filter groups can be numbered 0 to 1024, where 0 specifies that no filtering is done for that particular traffic type.

**Note**

The actual filters specified in these commands must be created by setting the appropriate attributes in the DOCS-SUBMGT-MIB MIB using SNMP SET commands.

**cable submgmt default filter-group cpe downstream** *group-id*

Sets the docsSubMgtSubFilterDownDefault attribute, which is the default value for the docsSubMgtSubFilterDownstream attribute in the docsSubMgtCmFilterTable. This attribute applies to downstream traffic that is sent to the CPE devices behind a particular CM.

**cable submgmt default filter-group cpe upstream** *group-id*

Sets the docsSubMgtSubFilterUpDefault attribute, which is the default value for the docsSubMgtSubFilterUpstream attribute in the docsSubMgtCmFilterTable. This attribute applies to upstream traffic that is sent by the CPE devices behind a particular CM.

**cable submgmt default filter-group cm downstream** *group-id*

Sets the docsSubMgtCmFilterDownDefault attribute, which is the default value for the docsSubMgtCmFilterDownstream attribute in the docsSubMgtCmFilterTable. This attribute applies to downstream traffic that is addressed to a particular CM.

**cable submgmt default filter-group cm upstream** *group-id*

Sets the docsSubMgtCmFilterUpDefault attribute, which is the default value for the docsSubMgtCmFilterUpstream attribute in the docsSubMgtCmFilterTable. This attribute applies to upstream traffic that is sent by a particular CM.

**Note**

For more information about using static CPE override, see the Cisco CMTS Static CPE Override feature on Cisco.com.

## Examples

The following commands specify that the CMTS defaults to actively managing the CPE devices for each CM that registers, allowing and learning up to four IP addresses for the CPE devices behind that CM.

```
Router# configure terminal
Router(config)# cable submgmt default active
Router(config)# cable submgmt default learnable
Router(config)# cable submgmt default max-cpe 4
```



The following commands specify that the CMTS defaults to actively managing the CPE devices for each CM that registers. Each CM, however, must specify its own MAX-CPE value; otherwise, that value defaults to 0 and all traffic to and from the CPE devices for that CM is blocked.

```
Router# configure terminal
Router(config)# cable submgmt default active
Router(config)# cable submgmt default max-cpe 0
```

The following commands specify that the CMTS defaults to not actively managing the CPE devices for each CM that registers. However, if the CM at registration time indicates that the CMTS is to actively manage the CPE devices, the CMTS defaults to allowing only one CPE device. Learning also is disabled, so that one CPE device, therefore, must be specified in the DOCSIS configuration file that the CM uses to register.

```
Router# configure terminal
Router(config)# no cable submgmt default active
Router(config)# no cable submgmt default learnable
Router(config)# cable submgmt default max-cpe 1
```

The following commands specify that the CMTS defaults to assigning three filter groups to each CM that registers. Unless the CM indicates otherwise at registration time, downstream and upstream traffic for the CPE devices behind the CM is filtered according to the rules for filter groups 20 and 21, respectively. Filter group 1 is applied to the downstream traffic addressed to the CM. Upstream traffic sent by the CM, however, is not filtered.

```
Router# configure terminal
Router(config)# cable submgmt default filter-group cpe downstream 20
Router(config)# cable submgmt default filter-group cpe upstream 21
Router(config)# cable submgmt default filter-group cm downstream 1
Router(config)# cable submgmt default filter-group cm upstream 0
```

**Note**

The above example assumes that filter groups 1, 20, and 21 have already been created on the CMTS using the appropriate SNMP commands.

**Related Commands**

| Command                   | Description                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------|
| <b>cable filter group</b> | Creates a DOCSIS 1.1 filter group that filters packets on the basis of the TCP/IP and UDP/IP headers. |

# cable sync-interval

To specify the interval between successive sync message transmissions from the Cisco CMTS, use the **cable sync-interval** command in cable interface configuration mode. To return the sync message interval to its default value, use the **no** form of this command.

**cable sync-interval** *msec*

**no cable sync-interval**

|                    |                                                                                                                                                                                       |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>msec</i> Specifies the interval in milliseconds (ms) between successive sync message transmissions from the Cisco CMTS. Valid values are from 1 to 200 ms. Default value is 10 ms. |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |       |
|-----------------|-------|
| Command Default | 10 ms |
|-----------------|-------|

|               |                                                |
|---------------|------------------------------------------------|
| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3 NA | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | To verify whether or not a sync message interval has been configured, enter the <b>show running-config</b> command and look for the cable interface configuration information. If a sync message interval has been configured, it appears in this output. If the sync message interval has been deactivated or reset to its default value, no sync interval command line appears in the output. |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                             |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows how to specify the interval for the sync message transmissions to 100 ms:<br>Router (config-if)# <b>cable sync-interval 100</b> |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|



# Cable Commands: cable t

Revised: August 12, 2013, OL-15510-17

## New Commands

| Command                 | Cisco IOS Software Release |
|-------------------------|----------------------------|
| cable tag               | 12.2(33)SCC                |
| cable tx-power-headroom | 12.2(33)SCE3               |
| cable throttle-modem    | 12.2(33)SCF3               |

## Modified Commands

| Command   | Cisco IOS Software Release |
|-----------|----------------------------|
| cable tag | 12.2(33)SCH                |

# cable tag

To configure a tag for a DOCSIS load balancing group on the CMTS, use the **cable load-balance docsis-group** command in the global configuration mode. To delete the tag and remove it from the CMTS configuration, use the **no** form of this command.

```
cable tag 1-1000

no cable tag 1-1000
```

|                    |        |                               |
|--------------------|--------|-------------------------------|
| Syntax Description | 1-1000 | Specifies a cable tag number. |
|--------------------|--------|-------------------------------|

|                 |       |
|-----------------|-------|
| Command Default | None. |
|-----------------|-------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

| Command History | Release     | Modification                                                      |
|-----------------|-------------|-------------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced.                                      |
|                 | 12.2(33)SCH | This command was modified. The tag to exclude TLV type was added. |

Usage Guidelines

The **cable tag** command creates a tag with the specified number and then enters the CMTS-tag configuration mode. Use the following commands in the CMTS-tag configuration mode to configure the tag:

- **docsis-version**
- **exclude**
- **exit**
- **name**
- **oui**
- **override**
- **service-class**
- **service-type-id**
- **tlv**

Examples

The following example shows how to create a tag numbered as “1” following which the system enters the cmts-tag configuration mode:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable tag 1
Router(config-cmts-tag)# name CSCO
```

```

Router(config-cmts-tag)# service-type-id commercial
Router(config-cmts-tag)# service-class work
Router(config-cmts-tag)# docsis-version docsis20
Router(config-cmts-tag)# oui 00.1a.c3
Router(config-cmts-tag)# override

```

The following example shows how to configure the tag to exclude a DOCSIS version, a MAC address, a service class name, or a service type ID.

```

Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable tag 1
Router(config-cmts-tag)# exclude docsis-version docsis10
Router(config-cmts-tag)# exclude oui 00.1a.c3
Router(config-cmts-tag)# exclude service-class work
Router(config-cmts-tag)# exclude service-type-id commercial

```

In Cisco IOS Release 12.2(33)SCH, TLV type was introduced. The following example shows how to configure the tag to exclude the TLV type:

```

Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable tag 1
Router(config-cmts-tag)# exclude tlv mrccs 4

```

## Related Commands

| Command                | Description                                                                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>docsis-version</b>  | Configures the specified DOCSIS version of the cable modem (CM) for the tag.                                                                              |
| <b>exclude</b>         | Configures the tag to exclude a DOCSIS version, a MAC address, a service class name, or a service type ID.                                                |
| <b>name</b>            | Specifies the name of the tag.                                                                                                                            |
| <b>oui</b>             | Configures the specified Organization Unique Identifier (OUI) of the CM for the tag.                                                                      |
| <b>override</b>        | Overrides type/length/value (TLV) or Simple Network Management Protocol (SNMP) settings when assigning the restricted load balancing group (RLBG) to CMs. |
| <b>service-class</b>   | Configures the specified service class name for the tag.                                                                                                  |
| <b>service-type-id</b> | Configures the specified service type ID for the tag.                                                                                                     |
| <b>tag</b>             | Associates the cable modem tag with a RLBG.                                                                                                               |
| <b>tlv</b>             | Configures a TLV type matching rule.                                                                                                                      |

# cable telco-return enable

To enable telco-return support, use the **cable telco-return enable** command in cable interface configuration mode. To disable this feature, use the **no** form of this command.

- telco-return enable
- no cable telco-return enable

| Syntax Description | This command has no arguments or keywords.                                                                                    |         |              |           |                              |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-----------|------------------------------|
| Command Default    | Telco-return support is disabled.                                                                                             |         |              |           |                              |
| Command Modes      | Interface configuration (cable interface only)                                                                                |         |              |           |                              |
| Command History    | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>12.0(4)XI</td><td>This command was introduced.</td></tr></table> | Release | Modification | 12.0(4)XI | This command was introduced. |
| Release            | Modification                                                                                                                  |         |              |           |                              |
| 12.0(4)XI          | This command was introduced.                                                                                                  |         |              |           |                              |

Examples

The following example shows how to enable telco-return:  
Router(config-if)# **cable telco-return enable**



Note

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

| Related Commands                         | <table><tr><th>Command</th><th>Description</th></tr><tr><td>cable telco-return interval</td><td>Defines the interval for sending Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages.</td></tr><tr><td>cable telco-return registration-ip</td><td>Selects a different IP address for the telco-return CM to send its registration requests.</td></tr><tr><td>cable telco-return spd dhcp-authenticate</td><td>Indicates that telco-return CMs must use a specific DHCP server.</td></tr><tr><td>cable telco-return spd dhcp-server</td><td>Identifies the IP address of the DHCP server that the telco-return CMs must use.</td></tr><tr><td>cable telco-return spd dial-timer</td><td>Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.</td></tr><tr><td>cable telco-return spd factory-default</td><td>Indicates the service provider descriptor (SPD) that the telco-return CM uses during the initialization process.</td></tr><tr><td>cable telco-return spd manual-dial</td><td>Enables the telco-return CM to operate in manual-dial mode.</td></tr></table> | Command | Description | cable telco-return interval | Defines the interval for sending Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages. | cable telco-return registration-ip | Selects a different IP address for the telco-return CM to send its registration requests. | cable telco-return spd dhcp-authenticate | Indicates that telco-return CMs must use a specific DHCP server. | cable telco-return spd dhcp-server | Identifies the IP address of the DHCP server that the telco-return CMs must use. | cable telco-return spd dial-timer | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call. | cable telco-return spd factory-default | Indicates the service provider descriptor (SPD) that the telco-return CM uses during the initialization process. | cable telco-return spd manual-dial | Enables the telco-return CM to operate in manual-dial mode. |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------------|------------------------------------------------------------------|------------------------------------|----------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------|
| Command                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |             |                             |                                                                                                                        |                                    |                                                                                           |                                          |                                                                  |                                    |                                                                                  |                                   |                                                                                                                 |                                        |                                                                                                                  |                                    |                                                             |
| cable telco-return interval              | Defines the interval for sending Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |             |                             |                                                                                                                        |                                    |                                                                                           |                                          |                                                                  |                                    |                                                                                  |                                   |                                                                                                                 |                                        |                                                                                                                  |                                    |                                                             |
| cable telco-return registration-ip       | Selects a different IP address for the telco-return CM to send its registration requests.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |             |                             |                                                                                                                        |                                    |                                                                                           |                                          |                                                                  |                                    |                                                                                  |                                   |                                                                                                                 |                                        |                                                                                                                  |                                    |                                                             |
| cable telco-return spd dhcp-authenticate | Indicates that telco-return CMs must use a specific DHCP server.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |             |                             |                                                                                                                        |                                    |                                                                                           |                                          |                                                                  |                                    |                                                                                  |                                   |                                                                                                                 |                                        |                                                                                                                  |                                    |                                                             |
| cable telco-return spd dhcp-server       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |             |                             |                                                                                                                        |                                    |                                                                                           |                                          |                                                                  |                                    |                                                                                  |                                   |                                                                                                                 |                                        |                                                                                                                  |                                    |                                                             |
| cable telco-return spd dial-timer        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |             |                             |                                                                                                                        |                                    |                                                                                           |                                          |                                                                  |                                    |                                                                                  |                                   |                                                                                                                 |                                        |                                                                                                                  |                                    |                                                             |
| cable telco-return spd factory-default   | Indicates the service provider descriptor (SPD) that the telco-return CM uses during the initialization process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |             |                             |                                                                                                                        |                                    |                                                                                           |                                          |                                                                  |                                    |                                                                                  |                                   |                                                                                                                 |                                        |                                                                                                                  |                                    |                                                             |
| cable telco-return spd manual-dial       | Enables the telco-return CM to operate in manual-dial mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |             |                             |                                                                                                                        |                                    |                                                                                           |                                          |                                                                  |                                    |                                                                                  |                                   |                                                                                                                 |                                        |                                                                                                                  |                                    |                                                             |

|                                                |                                                                                                                   |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd password</b>         | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>         | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b> | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>     | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b> | Includes the service provider name in the SPD message.                                                            |
| <b>cable telco-return spd threshold</b>        | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>         | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return interval

To set the interval for sending Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages, use the **cable telco-return interval** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return interval** *seconds*

**no cable telco-return interval**

|                    |                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>seconds</i> Number of seconds between intervals for sending TCD and TSI messages. Valid range is 2 through 60 seconds. |
|--------------------|---------------------------------------------------------------------------------------------------------------------------|

|                 |           |
|-----------------|-----------|
| Command Default | 2 seconds |
|-----------------|-----------|

|               |                                                |
|---------------|------------------------------------------------|
| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|

| Command History | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>12.0(4)XI</td><td>This command was introduced.</td></tr></table> | Release | Modification | 12.0(4)XI | This command was introduced. |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-----------|------------------------------|
| Release         | Modification                                                                                                                  |         |              |           |                              |
| 12.0(4)XI       | This command was introduced.                                                                                                  |         |              |           |                              |

**Examples** The following example shows how to set the TCD and TSI message interval to 40 seconds:

```
Router(config-if)# cable telco-return interval 40
```

**Note**

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

| Related Commands | Command                                         | Description                                                                                                      |
|------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable telco-return enable</b>                | Enables telco-return functionality.                                                                              |
|                  | <b>cable telco-return registration-ip</b>       | Selects a different IP address for the telco-return CM to send its registration requests.                        |
|                  | <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                                                 |
|                  | <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                 |
|                  | <b>cable telco-return spd dial-timer</b>        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.  |
|                  | <b>cable telco-return spd factory-default</b>   | Indicates the service provider descriptor (SPD) that the telco-return CM uses during the initialization process. |
|                  | <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                      |



|                                                |                                                                                                                   |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd password</b>         | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>         | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b> | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>     | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b> | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>        | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>         | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return registration-ip

To select a different IP address for the telco-return CM to send its registration requests, use the **cable telco-return registration-ip** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return registration-ip** *ip-address*

**no cable telco-return registration-ip**

## Syntax Description

*ip-address* Registration IP address that is sent in Termination System Information (TSI) messages. Value is any of the cable interface's IP addresses.

## Command Default

The downstream channel IP address of the Cisco CMTS is used.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release   | Modification                 |
|-----------|------------------------------|
| 12.1(2)EC | This command was introduced. |

## Usage Guidelines

This command sets the Registration IP Address parameter in TSI messages. By default, the downstream channel IP address of the Cisco CMTS is also used for the registration IP address. When this **cable telco-return registration-ip** command is configured, telco-return CMs send their registration requests to this IP address instead of to the downstream channel IP address.



### Note

This command is available only in images that support telco-return. These images have a "t" as part of the image name.

## Examples

The following example shows how to send the CM's registration requests to IP address 172.16.1.1:

```
Router(config-if)# cable telco-return registration-ip 172.16.1.1
```

## Related Commands

| Command                                         | Description                                                                           |
|-------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>cable telco-return enable</b>                | Enables telco-return functionality.                                                   |
| <b>cable telco-return interval</b>              | Defines the interval for sending Telephony Channel Descriptor (TCD) and TSI messages. |
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                      |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.      |

|                                                |                                                                                                                   |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd dial-timer</b>       | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd factory-default</b>  | Indicates the service provider descriptor (SPD) that the telco-return CM uses during the initialization process.  |
| <b>cable telco-return spd manual-dial</b>      | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd password</b>         | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>         | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b> | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>     | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b> | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>        | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>         | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd dhcp-authenticate

To require the telco-return CM to use a specific Dynamic Host Configuration Protocol (DHCP) server, use the **cable telco-return spd dhcp-authenticate** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return spd *spd-number* dhcp-authenticate**

**no cable telco-return spd *spd-number* dhcp-authenticate**

## Syntax Description

*spd-number* Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5.

## Command Default

The CM can use any available DHCP server.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release   | Modification                 |
|-----------|------------------------------|
| 12.0(4)XI | This command was introduced. |

## Usage Guidelines

This command sets the DHCP Authenticate parameter to TRUE (1) for the specified SPD in the Telephony Channel Descriptor (TCD) messages. It indicates that the CM must use the DHCP server that is specified with the **cable telco-return spd dhcp-server** command.



### Note

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

## Examples

The following example indicates that for SPD 2, CMs must use the DHCP server identified by IP address 192.168.255.255:

```
Router(config-if)# cable telco-return spd 2 dhcp-authenticate
Router(config-if)# cable telco-return spd 2 dhcp-server 192.168.255.255
```

## Related Commands

| Command                                   | Description                                                                               |
|-------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>cable telco-return enable</b>          | Enables telco-return functionality.                                                       |
| <b>cable telco-return interval</b>        | Defines the interval for sending TCD and Termination System Information (TSI) messages.   |
| <b>cable telco-return registration-ip</b> | Selects a different IP address for the telco-return CM to send its registration requests. |

|                                                |                                                                                                                   |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd dhcp-server</b>      | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
| <b>cable telco-return spd dial-timer</b>       | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd factory-default</b>  | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
| <b>cable telco-return spd manual-dial</b>      | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd password</b>         | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>         | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b> | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>     | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b> | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>        | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>         | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd dhcp-server

To identify the IP address of the Dynamic Host Configuration Protocol (DHCP) server that the telco-return CM must access, use the **cable telco-return spd dhcp-server** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return spd** *spd-number* **dhcp-server** *ip-address*

**no cable telco-return spd** *spd-number* **dhcp-server**

|                    |                   |                                                                                                       |
|--------------------|-------------------|-------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>spd-number</i> | Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5. |
|                    | <i>ip-address</i> | IP address of the DHCP server that CMs must use.                                                      |

Command DefaultThe IP address is set to 0.

Command ModesInterface configuration (cable interface only)

|                 |           |                              |
|-----------------|-----------|------------------------------|
| Command History | Release   | Modification                 |
|                 | 12.0(4)XI | This command was introduced. |

Usage GuidelinesThis command sets the DHCP Server parameter in the specified SPD in Telephony Channel Descriptor (TCD) messages. Telco-return CMs use the DHCP server that is identified by this IP address if the **cable telco-return spd dhcp-authenticate** command is configured. If the **cable telco-return spd dhcp-authenticate** command is not configured, the CMs use any available DHCP server.

  
Note

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

ExamplesThe following example indicates that for SPD 2, CMs must use the DHCP server identified by IP address 192.168.255.255:

```
Router(config-if)# cable telco-return spd 2 dhcp-authenticate
Router(config-if)# cable telco-return spd 2 dhcp-server 192.168.255.255
```

|                  |                                    |                                                                                         |
|------------------|------------------------------------|-----------------------------------------------------------------------------------------|
| Related Commands | Command                            | Description                                                                             |
|                  | <b>cable telco-return enable</b>   | Enables telco-return functionality.                                                     |
|                  | <b>cable telco-return interval</b> | Defines the interval for sending TCD and Termination System Information (TSI) messages. |

|                                                 |                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return registration-ip</b>       | Selects a different IP address for the telco-return CM to send its registration requests.                         |
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                                                  |
| <b>cable telco-return spd dial-timer</b>        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd factory-default</b>   | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
| <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd password</b>          | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>          | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b>  | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>      | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b>  | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>         | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>          | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd dial-timer

To set the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call, use the **cable telco-return spd dial-timer** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return spd** *spd-number* **dial-timer** *seconds*

**no cable telco-return spd** *spd-number* **dial-timer**

|                    |                   |                                                                                                                                                                                 |
|--------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>spd-number</i> | Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5.                                                                           |
|                    | <i>seconds</i>    | Number of seconds that a connection is idle before the CM disconnects the call. Valid range is 0 through 4,294,967,295. The default of 0 means that the dial-timer is not used. |

|                 |                                                                                                   |
|-----------------|---------------------------------------------------------------------------------------------------|
| Command Default | The dial-timer is set to 0, which means that inactive telephone connections are not disconnected. |
|-----------------|---------------------------------------------------------------------------------------------------|

|               |                                                |
|---------------|------------------------------------------------|
| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|

| Command History | Release   | Modification                 |
|-----------------|-----------|------------------------------|
|                 | 12.0(4)XI | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command sets the Demand Dial Timer parameter for the specified SPD in Telephony Channel Descriptor (TCD) messages. This enables the CM to emulate true dial-on-demand functionality by monitoring inactive networking time and allowing it to disconnect any telephone connection that exceeds the timer. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



|      |                                                                                                                        |
|------|------------------------------------------------------------------------------------------------------------------------|
| Note | This command is available only in images that support telco-return. These images have a “t” as part of the image name. |
|------|------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                            |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to set the timer to 2 hours:</p> <pre>Router(config-if)# cable telco-return spd 2 dial-timer 7200</pre> |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                            | Description                                                                             |
|------------------|------------------------------------|-----------------------------------------------------------------------------------------|
|                  | <b>cable telco-return enable</b>   | Enables telco-return functionality.                                                     |
|                  | <b>cable telco-return interval</b> | Defines the interval for sending TCD and Termination System Information (TSI) messages. |



|                                                 |                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return registration-ip</b>       | Selects a different IP address for the telco-return CM to send its registration requests.                         |
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                                                  |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
| <b>cable telco-return spd factory-default</b>   | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
| <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd password</b>          | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>          | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b>  | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>      | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b>  | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>         | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>          | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd factory-default

To indicate the service provider descriptor (SPD) that the telco-return CM uses during the initialization process, use the **cable telco-return spd factory-default** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

```
cable telco-return spd spd-number factory-default

no cable telco-return spd spd-number factory-default
```

|                    |                   |                                                                                                                                                   |
|--------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>spd-number</i> | Service provider descriptor (SPD) that contains the set of telephony attributes used by the CM during initialization. Valid range is 1 through 5. |
|--------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                        |  |
|-----------------|------------------------------------------------------------------------------------------------------------------------|--|
| Command Default | The Factory Default Flag in the SPD is set to 0, which means that this SPD is not used for the initialization process. |  |
|-----------------|------------------------------------------------------------------------------------------------------------------------|--|

|               |                                                |  |
|---------------|------------------------------------------------|--|
| Command Modes | Interface configuration (cable interface only) |  |
|---------------|------------------------------------------------|--|

| Command History | Release   | Modification                 |
|-----------------|-----------|------------------------------|
|                 | 12.0(4)XI | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                         |  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Usage Guidelines | This command sets the Factory Default parameter in the specified SPD in Telephony Channel Descriptor (TCD) messages. This determines the set of telephony attributes, as defined by the SPD, that are used for the initialization process when the CM is powered on or is reset to its factory default. |  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

**Note**

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

|          |                                                                                                                                                                                        |  |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Examples | The following example shows how to set the telco-return CM to use SPD 2 during the initialization procedure:<br><br>Router(config-if)# <b>cable telco-return spd 2 factory-default</b> |  |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

| Related Commands | Command                                   | Description                                                                               |
|------------------|-------------------------------------------|-------------------------------------------------------------------------------------------|
|                  | <b>cable telco-return enable</b>          | Enables telco-return functionality.                                                       |
|                  | <b>cable telco-return interval</b>        | Defines the interval for sending TCD and Termination System Information (TSI) messages.   |
|                  | <b>cable telco-return registration-ip</b> | Selects a different IP address for the telco-return CM to send its registration requests. |

|                                                 |                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific Dynamic Host Configuration Protocol (DHCP) server.            |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
| <b>cable telco-return spd dial-timer</b>        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd password</b>          | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>          | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b>  | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>      | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b>  | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>         | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>          | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd manual-dial

To enable the telco-return CM to operate in manual-dial mode, use the **cable telco-return spd manual-dial** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return spd *spd-number* manual-dial**

**no cable telco-return spd *spd-number* manual-dial**

|                    |                   |                                                                                                       |
|--------------------|-------------------|-------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>spd-number</i> | Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5. |
|--------------------|-------------------|-------------------------------------------------------------------------------------------------------|

|                 |                               |
|-----------------|-------------------------------|
| Command Default | Manual-dial mode is disabled. |
|-----------------|-------------------------------|

|               |                                                |
|---------------|------------------------------------------------|
| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|

|                 |           |                              |
|-----------------|-----------|------------------------------|
| Command History | Release   | Modification                 |
|                 | 12.0(4)XI | This command was introduced. |

|                  |                                                                                                                                  |
|------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command sets the Manual Dial vendor-specific parameter in the specified SPD in Telephony Channel Descriptor (TCD) messages. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------|

|                                                                                          |                                                                                                                        |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
|  Note | This command is available only in images that support telco-return. These images have a “t” as part of the image name. |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                          |
|----------|------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows how to set manual-dial mode for SPD 1:<br><pre>Router(config-if)# cable telco-return spd 1 manual-dial</pre> |
|----------|------------------------------------------------------------------------------------------------------------------------------------------|

|                  |                                                 |                                                                                           |
|------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------|
| Related Commands | Command                                         | Description                                                                               |
|                  | <b>cable telco-return enable</b>                | Enables telco-return functionality.                                                       |
|                  | <b>cable telco-return interval</b>              | Defines the interval for sending TCD and Termination System Information (TSI) messages.   |
|                  | <b>cable telco-return registration-ip</b>       | Selects a different IP address for the telco-return CM to send its registration requests. |
|                  | <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                          |

|                                                |                                                                                                                   |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd dhcp-server</b>      | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
| <b>cable telco-return spd dial-timer</b>       | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd factory-default</b>  | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
| <b>cable telco-return spd password</b>         | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>         | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b> | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>     | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b> | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>        | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>         | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd password

To set the password that the telco-return CM uses for authentication when establishing a PPP connection with the access server, use the **cable telco-return spd password** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return spd** *spd-number* **password** *password-string*

**no cable telco-return spd** *spd-number* **password**

|                    |                        |                                                                                                       |
|--------------------|------------------------|-------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>spd-number</i>      | Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5. |
|                    | <i>password-string</i> | Login password that the CM uses for authentication during the initialization procedure.               |

**Command Default** No password is used.

**Command Modes** Interface configuration (cable interface only)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.0(4)XI      | This command was introduced. |

**Usage Guidelines** This command sets the Login Password parameter for the specified SPD in Telephony Channel Descriptor (TCD) messages.



**Note**

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

**Examples** The following example shows how to set the password to 9JwoKd7 in service provider descriptor 2:

```
Router(config-if)# cable telco-return spd 2 password 9JwoKd7
```

|                  |                                           |                                                                                           |
|------------------|-------------------------------------------|-------------------------------------------------------------------------------------------|
| Related Commands | <b>Command</b>                            | <b>Description</b>                                                                        |
|                  | <b>cable telco-return enable</b>          | Enables telco-return functionality.                                                       |
|                  | <b>cable telco-return interval</b>        | Defines the interval for sending TCD and Termination System Information (TSI) messages.   |
|                  | <b>cable telco-return registration-ip</b> | Selects a different IP address for the telco-return CM to send its registration requests. |

|                                                 |                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                                                  |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
| <b>cable telco-return spd dial-timer</b>        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd factory-default</b>   | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
| <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd phonenum</b>          | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b>  | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>      | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b>  | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>         | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>          | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd phonenum

To set the telephone numbers that the telco-return CM uses when connecting to the headend’s network access server, use the **cable telco-return spd phonenum** command in cable interface configuration mode. To delete previously entered telephone numbers, use the **no** form of this command.

**cable telco-return spd** *spd-number* **phonenum** *dial-string*

**no cable telco-return spd** *spd-number* **phonenum** *dial-string*

|                    |                    |                                                                                                       |
|--------------------|--------------------|-------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>spd-number</i>  | Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5. |
|                    | <i>dial-string</i> | Telephone number that the CM uses to connect to the headend’s network access server.                  |

**Command Default** No default behavior or values

**Command Modes** Interface configuration (cable interface only)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.0(4)XI      | This command was introduced. |

**Usage Guidelines** This command sets the Phone Number parameters in the specified SPD in Telephony Channel Descriptor (TCD) messages. You can repeat this command, entering as many as three telephone numbers for the CM to use when attempting to establish a PPP connection with the network access server. The phone numbers are mapped to the parameters Phone Number1, Phone Number2, Phone Number3 in the order in which you enter them. The CM attempts to connect using Phone Number1 first. If it fails to connect, and its number of retries exceeds the limit set with the **cable telco-return spd threshold** command, the CM dials the next number in the list.



**Note** This command is available only in images that support telco-return. These images have a “t” as part of the image name.

**Examples** The following example shows how to set the primary phone number to 9255551212. If the CM fails to connect using that number, it tries the next phone number, 9255551234:

```
Router(config-if)# cable telco-return spd 2 phonenum 9255551212
Router(config-if)# cable telco-return spd 2 phonenum 9255551234
```



**Related Commands**

| <b>Command</b>                                  | <b>Description</b>                                                                                              |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return enable</b>                | Enables telco-return functionality.                                                                             |
| <b>cable telco-return interval</b>              | Defines the interval for sending TCD and Termination System Information (TSI) messages.                         |
| <b>cable telco-return registration-ip</b>       | Selects a different IP address for the telco-return CM to send its registration requests.                       |
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                                                |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                |
| <b>cable telco-return spd dial-timer</b>        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call. |
| <b>cable telco-return spd factory-default</b>   | Indicates the SPD that the telco-return CM uses during the initialization process.                              |
| <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                     |
| <b>cable telco-return spd password</b>          | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.          |
| <b>cable telco-return spd ppp-authenticate</b>  | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.          |
| <b>cable telco-return spd radius-realm</b>      | Selects a RADIUS server domain to use for the login response string.                                            |
| <b>cable telco-return spd service-provider</b>  | Includes the service provider name in the SPD.                                                                  |
| <b>cable telco-return spd threshold</b>         | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.      |
| <b>cable telco-return spd username</b>          | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.          |

# cable telco-return spd ppp-authenticate

To select the authentication method used when the telco-return CM is establishing a PPP connection, use the **cable telco-return spd ppp-authenticate** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return spd *spd-number* ppp-authenticate [both | chap | pap]**

**no cable telco-return spd *spd-number* ppp-authenticate**

## Syntax Description

|                   |                                                                                                                                                                                                                |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>spd-number</i> | Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5.                                                                                                          |
| <b>both</b>       | Challenge Handshake Authentication Protocol (CHAP) is used if the network access server supports CHAP. Password Authentication Protocol (PAP) is used only if the network access server does not support CHAP. |
| <b>chap</b>       | CHAP authentication is used.                                                                                                                                                                                   |
| <b>pap</b>        | PAP authentication is used.                                                                                                                                                                                    |

## Command Default

The default is **both**; either CHAP or PAP is used depending on the methods supported by the network access server.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release   | Modification                 |
|-----------|------------------------------|
| 12.0(4)XI | This command was introduced. |

## Usage Guidelines

This command sets the PPP Authentication parameter for the specified SPD in Telephony Channel Descriptor (TCD) messages.



### Note

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

## Examples

The following example requires the CM to perform CHAP authentication:

```
Router(config-if)# cable telco-return spd 2 ppp-authenticate chap
```

| Related Commands | Command                                         | Description                                                                                                       |
|------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable telco-return enable</b>                | Enables telco-return functionality.                                                                               |
|                  | <b>cable telco-return interval</b>              | Defines the interval for sending TCD and Termination System Information (TSI) messages.                           |
|                  | <b>cable telco-return registration-ip</b>       | Selects a different IP address for the telco-return CM to send its registration requests.                         |
|                  | <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                                                  |
|                  | <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
|                  | <b>cable telco-return spd dial-timer</b>        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
|                  | <b>cable telco-return spd factory-default</b>   | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
|                  | <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                       |
|                  | <b>cable telco-return spd password</b>          | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
|                  | <b>cable telco-return spd phonenum</b>          | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
|                  | <b>cable telco-return spd radius-realm</b>      | Selects a RADIUS server domain to use for the login response string.                                              |
|                  | <b>cable telco-return spd service-provider</b>  | Includes the service provider name in the SPD.                                                                    |
|                  | <b>cable telco-return spd threshold</b>         | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
|                  | <b>cable telco-return spd username</b>          | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd radius-realm

To select a RADIUS server domain to use for the login response string, use the **cable telco-return spd radius-realm** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return spd** *spd-number* **radius-realm** *string*

**no cable telco-return spd** *spd-number* **radius-realm**

|                    |                   |                                                                                                       |
|--------------------|-------------------|-------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>spd-number</i> | Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5. |
|                    | <i>string</i>     | Alphanumeric string identifying a RADIUS server domain.                                               |

**Command Default** The default value is the null string.

**Command Modes** Interface configuration (cable interface only)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.0(4)XI      | This command was introduced. |

**Usage Guidelines** This command sets the RADIUS Realm parameter for the specified SPD in Telephony Channel Descriptor (TCD) messages. When this command is configured, telco-return CMs use this realm string to construct a domain name for the login username when responding to a PPP login query.



**Note** This command is available only in images that support telco-return. These images have a “t” as part of the image name.

**Examples** The following example shows a login response string of “sandy@sunol”:

```
Router(config-if)# cable telco-return spd 3 radius-realm sunol
Router(config-if)# cable telco-return spd 3 username sandy
```

|                  |                                           |                                                                                           |
|------------------|-------------------------------------------|-------------------------------------------------------------------------------------------|
| Related Commands | <b>Command</b>                            | <b>Description</b>                                                                        |
|                  | <b>cable telco-return enable</b>          | Enables telco-return functionality.                                                       |
|                  | <b>cable telco-return interval</b>        | Defines the interval for sending TCD and Termination System Information (TSI) messages.   |
|                  | <b>cable telco-return registration-ip</b> | Selects a different IP address for the telco-return CM to send its registration requests. |

|                                                 |                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                                                  |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
| <b>cable telco-return spd dial-timer</b>        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd factory-default</b>   | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
| <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd password</b>          | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>          | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b>  | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd service-provider</b>  | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>         | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>          | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd service-provider

To include the service provider name in the SPD, use the **cable telco-return service-provider** command in cable interface configuration mode. To remove the parameter from the SPD, use the **no** form of this command.

**cable telco-return spd** *spd-number* **service-provider** *spd-string*

**no cable telco-return spd** *spd-number* **service-provider**

## Syntax Description

|                   |                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------|
| <i>spd-number</i> | Service provider descriptor number for which this parameter is set. Valid range is 1 through 5. |
| <i>spd-string</i> | Alphanumeric string that identifies the service provider.                                       |

## Command Default

No default behavior or values

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release   | Modification                 |
|-----------|------------------------------|
| 12.0(4)XI | This command was introduced. |

## Usage Guidelines

This command sets the Service Provider Name parameter for the specified SPD in the Telephony Channel Descriptor (TCD) messages.



### Note

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

## Examples

The following example shows the service provider name being set to “san\_jose” for SPD 2:

```
Router(config-if)# cable telco-return spd 2 service-provider san_jose
```

## Related Commands

| Command                                         | Description                                                                               |
|-------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>cable telco-return enable</b>                | Enables telco-return functionality.                                                       |
| <b>cable telco-return interval</b>              | Defines the interval for sending TCD and Termination System Information (TSI) messages.   |
| <b>cable telco-return registration-ip</b>       | Selects a different IP address for the telco-return CM to send its registration requests. |
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                          |

|                                                |                                                                                                                   |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd dhcp-server</b>      | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
| <b>cable telco-return spd dial-timer</b>       | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd factory-default</b>  | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
| <b>cable telco-return spd manual-dial</b>      | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd password</b>         | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>         | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b> | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>     | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd threshold</b>        | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |
| <b>cable telco-return spd username</b>         | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd threshold

To set the number of failed dial-up connections that can occur before the CM indicates a connection failure, use the **cable telco-return spd threshold** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable telco-return spd** *spd-number* **threshold** *threshold-number*

**no cable telco-return spd** *spd-number* **threshold**

**Syntax Description**

|                         |                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------|
| <i>spd-number</i>       | Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5.           |
| <i>threshold-number</i> | Number of dial-up attempts that fail before the CM declares a connection failure. Valid range is 1 through 255. |

The default value is 1.

**Command Modes**

Interface configuration (cable interface only)

**Command History**

| Release   | Modification                 |
|-----------|------------------------------|
| 12.0(4)XI | This command was introduced. |

**Usage Guidelines**

This command sets the Connection Threshold parameter for the specified SPD in the Telephony Channel Descriptor (TCD) messages. A dial-up attempt is considered a connection failure if an answer connection is not made after ten rings. The CM continues to try to connect until the connection threshold is reached. If multiple phone numbers are configured using the **cable telco-return spd phonenum** command, the CM dials each phone number until it makes a connection or exceeds the configured threshold.



**Note**

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

**Examples**

The following example shows the connection threshold being set to 20:

```
Router(config-if)# cable telco-return spd 2 threshold 20
```

**Related Commands**

| Command                            | Description                                                                             |
|------------------------------------|-----------------------------------------------------------------------------------------|
| <b>cable telco-return enable</b>   | Enables telco-return functionality.                                                     |
| <b>cable telco-return interval</b> | Defines the interval for sending TCD and Termination System Information (TSI) messages. |



|                                                 |                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return registration-ip</b>       | Selects a different IP address for the telco-return CM to send its registration requests.                         |
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                                                  |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
| <b>cable telco-return spd dial-timer</b>        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd factory-default</b>   | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
| <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd password</b>          | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>          | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b>  | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>      | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b>  | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd username</b>          | Sets the username that the telco-return CM uses for authentication when establishing a PPP connection.            |

# cable telco-return spd username

To set the username that the telco-return CM uses for authentication when establishing a PPP connection with the access server, use the **cable telco-return spd username** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

```
cable telco-return spd spd-number username login-string

no cable telco-return spd spd-number username login-string
```

|                    |                     |                                                                                                       |
|--------------------|---------------------|-------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>spd-number</i>   | Service provider descriptor (SPD) number for which this parameter is set. Valid range is 1 through 5. |
|                    | <i>login-string</i> | Username that the CM uses for authentication during the initialization procedure.                     |

**Command Default** The default value is **guest**.

**Command Modes** Interface configuration (cable interface only)

|                 |           |                              |
|-----------------|-----------|------------------------------|
| Command History | Release   | Modification                 |
|                 | 12.0(4)XI | This command was introduced. |

**Usage Guidelines** This command sets the Login Username parameter for the specified SPD in the Telephony Channel Descriptor (TCD) messages.

  
**Note**

This command is available only in images that support telco-return. These images have a “t” as part of the image name.

**Examples** The following example shows the username being set to “sandy” for SPD 3:

```
Router(config-if)# cable telco-return spd 3 username sandy
```

|                  |                                           |                                                                                           |
|------------------|-------------------------------------------|-------------------------------------------------------------------------------------------|
| Related Commands | Command                                   | Description                                                                               |
|                  | <b>cable telco-return enable</b>          | Enables telco-return functionality.                                                       |
|                  | <b>cable telco-return interval</b>        | Defines the interval for sending TCD and Termination System Information (TSI) messages.   |
|                  | <b>cable telco-return registration-ip</b> | Selects a different IP address for the telco-return CM to send its registration requests. |

|                                                 |                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable telco-return spd dhcp-authenticate</b> | Indicates that telco-return CMs must use a specific DHCP server.                                                  |
| <b>cable telco-return spd dhcp-server</b>       | Identifies the IP address of the DHCP server that the telco-return CMs must use.                                  |
| <b>cable telco-return spd dial-timer</b>        | Sets the number of seconds that a telephone connection is idle before the telco-return CM disconnects the call.   |
| <b>cable telco-return spd factory-default</b>   | Indicates the SPD that the telco-return CM uses during the initialization process.                                |
| <b>cable telco-return spd manual-dial</b>       | Enables the telco-return CM to operate in manual-dial mode.                                                       |
| <b>cable telco-return spd password</b>          | Sets the password that the telco-return CM uses for authentication when establishing a PPP connection.            |
| <b>cable telco-return spd phonenum</b>          | Sets the telephone numbers that the telco-return CM dials when connecting to the headend's network access server. |
| <b>cable telco-return spd ppp-authenticate</b>  | Selects the authentication procedure to use when the telco-return CM is establishing a PPP connection.            |
| <b>cable telco-return spd radius-realm</b>      | Selects a RADIUS server domain to use for the login response string.                                              |
| <b>cable telco-return spd service-provider</b>  | Includes the service provider name in the SPD.                                                                    |
| <b>cable telco-return spd threshold</b>         | Sets the number of failed dial-up connections that can occur before the CM indicates a connection failure.        |

# cable tftp-enforce

To require that all CMs on a cable interface attempt to download a DOCSIS configuration file using the Trivial File Transfer Protocol (TFTP) through the cable interface before being allowed to register and come online, use the **cable tftp-enforce** command in cable interface configuration mode. To disable this feature, use the **no** form of this command.

```
cable tftp-enforce [mark-only]

no cable tftp-enforce [mark-only]
```

|                    |           |                                                                                                                                                                                                                                                       |
|--------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | mark-only | (Optional) Allow CMs to come online without attempting to download a DOCSIS configuration file through the Cisco CMTS cable interface, but prints a warning message and marks those CMs with a pound sign (#) in the <b>show cable modem</b> command. |
|--------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| Command Default | TFTP downloads through the Cisco CMTS are not required ( <b>no cable tftp-enforce</b> ). |
|-----------------|------------------------------------------------------------------------------------------|

|               |                                                |
|---------------|------------------------------------------------|
| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|

|                 |              |                                                                                                                                                                                                                                                        |
|-----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command History | Release      | Modification                                                                                                                                                                                                                                           |
|                 | 12.1(11b)EC1 | This command was introduced for the Cisco uBR7100 series and Cisco uBR7200 series universal broadband routers.                                                                                                                                         |
|                 | 12.1(19)EC   | CMs that fail the TFTP checked are now marked with a reject(c) error in the <b>show cable modem</b> command, instead of the original reject(m) error, so as to be consistent with the behavior in the Release 12.2 BC train.                           |
|                 | 12.2(8)BC2   | Support for this command was added to the 12.2 BC release train for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 universal broadband routers.                                                                                    |
|                 | 12.2(15)BC1  | The command was enhanced on the Cisco uBR10012 router to prevent the router from rejecting cable modems that did properly download a DOCSIS configuration file. See the <a href="#">“Operation on the Cisco uBR10012 Router” section on page 607</a> . |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | <p>The <b>cable tftp-enforce</b> cable interface configuration command requires all cable modems on a cable interface to attempt a TFTP request for the DOCSIS configuration file through the cable interface with the Cisco CMTS router before being allowed to register and come online. This can help prevent the following situations from occurring:</p> <ul style="list-style-type: none"><li>• Users who attempt theft-of-service by reconfiguring their local networks to allow the downloading of an unauthorized DOCSIS configuration file from a local TFTP server. Typically, some users do this to obtain services that they have not paid for, such as higher guaranteed bandwidths or a higher priority Quality of Service (QoS) profile.</li></ul> |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- Some brands or models of cable modems might be running older software releases that cache the DOCSIS configuration file and use the cached version instead of downloading the actual file from a TFTP server during the registration process. Although this can marginally speed up the registration process, it also violates the DOCSIS requirements and could create a situation in which the cable modem is not using the proper DOCSIS configuration file. A user might then be mistakenly accused of theft-of-service, when in reality the problem is the non-DOCSIS-compliant cable modem.

The **cable tftp-enforce** command identifies these situations and can block these cable modems from registering and coming online. This command also has a **mark-only** option that allows these cable modems to come online, but it also identifies the cable modems so that the network administrators can investigate the situation further before taking any action.

When the command is used without the **mark-only** option, cable modems that do not download a TFTP file through the cable interface are blocked from registering and coming online. The following message is displayed on the console when such a cable modem attempts to register:

```
06:53:57: %UBR7200-4-REGISTRATION_BEFORE_TFTP: Registration request unexpected:
Cable Modem did not attempt TFTP. Registration Rejected. CM Mac Addr <00ff.ff66.12fb>
```

The **mark-only** option allows cable modems that do not download the TFTP file to come online, but it also prints a warning message on the console and marks the cable modem in the **show cable modem** command with a pound sign (#). The following message is displayed on the console when such a cable modem registers with the Cisco CMTS.

```
06:53:57: %UBR7200-4-REGISTRATION_BEFORE_TFTP: Registration request unexpected:
Cable Modem did not attempt TFTP. Modem marked with #. CM Mac Addr <00ff.ff66.12fb>
```

**Tip**

Cisco recommends that you initially configure cable interfaces with the **mark-only** option, so that potential problems are identified without immediately interfering with users' ability to come online. After you identify and resolve these initial problems, reconfigure the cable interfaces without the **mark-only** option to block problem cable modems that attempt to come online without downloading a valid DOCSIS configuration file.

The default behavior is not to require the TFTP download through the cable interface with the Cisco CMTS router. Each cable interface must be configured with this command to require the TFTP download.

**Note**

The **cable tftp-enforce** command cannot be used on subinterfaces or on non-cable interfaces.

**Operation on the Cisco uBR10012 Router**

In Cisco IOS Release 12.2(15)BC1 and later releases, the Cisco uBR10012 router can occasionally allow a cable modem to temporarily come online before the system has received confirmation that the cable modem has downloaded the proper DOCSIS configuration file. This situation can occur when the cable interface line card receives a registration request (REG-REQ) message from a cable modem before the PRE1 module has notified the line card whether the modem did download the proper file from the TFTP server.

In previous Cisco IOS releases, these cable modems were not allowed to come online (or marked as TFTP violators) even if they had successfully downloaded the appropriate DOCSIS configuration file. In Cisco IOS Release 12.2(15)BC1 and later releases, however, the Cisco uBR10012 router allows these cable modems to temporarily come online until the PRE1 module has finished determining the modem's TFTP status. If the system determines that the modem did not download the appropriate DOCSIS configuration file, it is then taken offline (or marked as a TFTP violator).

**Note**

In the above situation, cable modems that do not download a DOCSIS configuration file are marked as “offline” instead of “reject(c)” by the **show cable modem** command. The console still displays the %UBR10000-4-REGISTRATION\_BEFORE\_TFTP error message, however, to allow you to identify these cable modems as TFTP violators.

**Examples**

The following example shows how to enforce TFTP downloads for all of the cable modems on cable interface 3/0. These cable modems must attempt a TFTP download of the DOCSIS configuration file through the cable interface with the Cisco CMTS. If they do not, they are not allowed to register or come online, and they are marked as having either a registration error—reject(c)—in the **show cable modem** command.

**Note**

The initial version of this feature marked CMs that failed the TFTP check as having a Message Integrity Check (MIC) failure—reject(m). The command was changed to show reject(c) in Cisco IOS Release 12.2(8)BC2 and Release 12.1(19)EC.

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable tftp-enforce
Router(config-if)# exit
Router(config)#

Router# show cable modems
```

| Interface   | Prim<br>Sid | Online<br>State | Timing<br>Offset | Rec<br>Power | QoS | CPE | IP address | MAC address     |
|-------------|-------------|-----------------|------------------|--------------|-----|-----|------------|-----------------|
| Cable3/0/U1 | 1           | online(pt)      | 2734             | 0.50         | 5   | 0   | 10.1.1.38  | 00ff.ffffa.0a35 |
| Cable3/0/U0 | 2           | online(pt)      | 2729             | 0.25         | 5   | 0   | 10.1.1.50  | 00ff.fff07.382f |
| Cable3/0/U0 | 3           | init(i)         | 2732             | 0.25         | 2   | 0   | 10.1.1.48  | 00ff.fff03.307d |
| Cable3/0/U1 | 4           | online(pt)      | 2737             | 0.75         | 5   | 0   | 10.1.1.34  | 00ff.fff59.4477 |
| Cable3/0/U1 | 5           | reject(m)       | 2215             | 0.25         | 2   | 0   | 10.1.1.47  | 00ff.fff66.12fb |

```
Router#
```

**Note**

DOCSIS-compliant cable modems that are rejected with a MIC failure go into the offline state for a short period of time and then retry the registration process.

The **debug cable registration** command can be used to display additional information:

```
Router# debug cable interface c3/0 verbose
Router# debug cable registration
CMTS registration debugging is on

Jun 6 23:27:15.859: Registration request from 00ff.fff66.12fb, SID 7 on Cable3/0/U1
Jun 6 23:27:15.859: Found a network access control parameter: Ok
Jun 6 23:27:15.859: Found a class of service block: Ok
Jun 6 23:27:15.859: Found Baseline Privacy config: Ok
Jun 6 23:27:15.859: Found Max CPE: Ok
Jun 6 23:27:15.859: Found CM MIC: Ok
Jun 6 23:27:15.859: Found CMTS MIC: Ok
Jun 6 23:27:15.859: Found modem ip: Ok
Jun 6 23:27:15.859: Found modem capabilities: Ok
Jun 6 23:27:15.859: Finished parsing REG Request
Jun 6 23:27:15.859: Cable Modem sent Registration Request without attempting required
TFTP
22:33:21 %UBR7200-4-REGISTRATION_BEFORE_TFTP: Registration request unexpected:
```

```

Cable Modem did not attempt TFTP. Registration Rejected. CM Mac Addr <00ff.ff66.12fb>
Registration failed for Cable Modem 00ff.ff66.12fb on interface Cable3/0/U0:
 CoS/Sflow/Cfr/PHS failed in REG-REQ
Jun 6 23:27:15.859: REG-RSP Status : failure (2)
Jun 6 23:27:15.859: Registration Response:
Jun 6 23:27:15.859: 0x0000: C2 00 00 1B 00 00 00 50 73 4E B4 19 00 05 00 E0
Jun 6 23:27:15.859: 0x0010: 56 AC 00 09 00 00 03 01 07 00 00 02 02
Jun 6 23:27:15.859: Registration Response Transmitted

```

The following example of the **mark-only** option shows how that cable modems that do not attempt a TFTP download through the Cisco CMTS are allowed to register and come online, but they are marked with a pound sign (#) when using the **show cable modem** command.

```

Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable tftp-enforce mark-only
Router(config-if)# exit
Router(config)#

```

```

Router# show cable modems

```

| Interface   | Prim<br>Sid | Online<br>State | Timing Rec<br>Offset Power | QoS | CPE | IP address | MAC address     |
|-------------|-------------|-----------------|----------------------------|-----|-----|------------|-----------------|
| Cable3/0/U1 | 1           | online(pt)      | 2734 0.50                  | 5   | 0   | 10.1.1.38  | 00ff.ffffa.0a35 |
| Cable3/0/U0 | 2           | online(pt)      | 2729 0.25                  | 5   | 0   | 10.1.1.50  | 00ff.fff07.382f |
| Cable3/0/U0 | 3           | init(i)         | 2732 0.25                  | 2   | 0   | 10.1.1.48  | 00ff.fff03.307d |
| Cable3/0/U1 | 4           | online(pt)      | 2737 0.75                  | 5   | 0   | 10.1.1.34  | 00ff.fff59.4477 |
| Cable3/0/U1 | 5           | #online         | 2213 0.25                  | 6   | 0   | 10.1.1.47  | 00ff.fff66.12fb |

```
Router#
```

The **debug cable registration** command can be used to display additional information:

```

Jun 6 23:27:15.859: Registration request from 00ff.ff66.12fb, SID 7 on Cable3/0/U1
Jun 6 23:27:15.859: Found a network access control parameter: Ok
Jun 6 23:27:15.859: Found a class of service block: Ok
Jun 6 23:27:15.859: Found Baseline Privacy config: Ok
Jun 6 23:27:15.859: Found Max CPE: Ok
Jun 6 23:27:15.859: Found CM MIC: Ok
Jun 6 23:27:15.859: Found CMTS MIC: Ok
Jun 6 23:27:15.859: Found modem ip: Ok
Jun 6 23:27:15.859: Found modem capabilities: Ok
Jun 6 23:27:15.859: Finished parsing REG Request
Jun 6 23:27:15.859: Cable Modem sent Registration Request without attempting required
TFTP
23:27:15: %UBR7200-4-REGISTRATION_BEFORE_TFTP: Registration request unexpected:
Cable Modem did not attempt TFTP. Modem marked with #. CM Mac Addr <00ff.ff66.12fb>
Jun 6 23:27:15.859: Sec sids obtained for all requested classes of service
Jun 6 23:27:15.859: Performing connection admission control (CAC) for each Sid
Jun 6 23:27:15.859: CAC Status for ClassID:1 is CAC_SUCCESS
Jun 6 23:27:15.859: Registration Status: ok (0)
Jun 6 23:27:15.859: Registration Response Transmitted

```



#### Tip

You can also use the **show interface cable sid** and **show cable qos profile** commands to examine the SID and service classes in use, to determine whether a CM has registered using unauthorized QoS parameters.

| Related Commands | Command                              | Description                                                                                                                                            |
|------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dynamic-secret</b>          | Enables the dynamic shared secret feature, so that DOCSIS configuration files are verified with a dynamically generated shared secret.                 |
|                  | <b>cable shared-secondary-secret</b> | Configures one or more secondary shared-secret keys that CMs can use to successfully process the DOCSIS configuration file and register with the CMTS. |
|                  | <b>cable shared-secret</b>           | Configures an authentication shared-secret key that CMs must use to successfully process the DOCSIS configuration file and register with the CMTS.     |
|                  | <b>debug cable registration</b>      | Displays debug messages for the CM registration process.                                                                                               |
|                  | <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                                                          |



# cable throttle-modem

To enable the Cable Modem Registration Throttling feature, which improves the cable modem online speed at initial ranging stage by reducing CPU usage, use the **cable throttle-modem** command in global configuration mode. To disable this feature, use the **no** form of this command.

**cable throttle-modem** *init-rate value* **holdoff-time** *value* **flush-rate** *value*

**no cable throttle-modem**

## Syntax Description

|                                  |                                                                                                                                                                                    |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>init-rate</b> <i>value</i>    | Specifies the maximum number of modems allowed to pass the initialization step per second. The valid range is from 1 to 1000. The default value is 32.                             |
| <b>holdoff-time</b> <i>value</i> | Specifies the maximum number of seconds a cable modem is allowed to wait in the throttling queue. The valid range is from 5 to 100. The default value is 45.                       |
| <b>flush-rate</b> <i>value</i>   | Specifies the maximum number of modems flushed per second from the throttling queue after the holdoff time expires. The valid range is from 100 to 1000. The default value is 300. |

## Command Default

This command is disabled by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCF3 | This command was introduced. |

## Usage Guidelines

The **cable throttle-modem** command enables dynamic adjustment of number of cable modems in the registration queue thus reducing CPU usage.

You must manually disable the **cable throttle-ranging** command configuration to enable the **cable throttle-modem** command configuration.



### Note

The **cable throttle-modem** command is available only on the Cisco uBR10012 CMTS.

## Examples

The following example shows how to enable the Cable Modem Registration Throttling feature on a Cisco CMTS:

```
Router# configure terminal
Router(config)# cable throttle-modem init-rate 1 holdoff-time 5 flush-rate 100
```

Related Commands

| Command                          | Description                                        |
|----------------------------------|----------------------------------------------------|
| <b>cable throttle-ranging</b>    | Enables faster cable modem registration times.     |
| <b>show cable throttle-modem</b> | Displays cable throttle configuration information. |

# cable throttle-ranging

To enable faster cable modem registration times, use the **cable throttle-ranging** command in global configuration mode. To disable faster cable modem registration times, use the **no** form of this command.

**cable throttle-ranging**

**no cable throttle-ranging**

|                           |                                           |
|---------------------------|-------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords |
|---------------------------|-------------------------------------------|

|                 |                                      |
|-----------------|--------------------------------------|
| <b>Defaults</b> | This command is disabled by default. |
|-----------------|--------------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.3(21)BC     | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>The <b>cable throttle-ranging</b> command enables faster cable modem registration times on the CMTS.</p> <p>Reload the Cisco CMTS with a Cisco IOS Release 12.3(21)BC image and configure the <b>cable throttle-ranging</b> command on the CMTS. Once the <b>cable throttle-ranging</b> has been configured, save the new configuration and reload the Cisco CMTS again. Faster cable modem registration times will now be enabled on the Cisco CMTS.</p> |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



|             |                                                                                |
|-------------|--------------------------------------------------------------------------------|
| <b>Note</b> | The <b>cable throttle-ranging</b> command is only available on an ubr10k CMTS. |
|-------------|--------------------------------------------------------------------------------|

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable Fast CM registration feature on a Cisco CMTS: |
|-----------------|-----------------------------------------------------------------------------------------|

```
Router(config)# cable throttle-ranging
```

# cable time-server

To enable the integrated time-of-day (ToD) server on the Cisco CMTS series, enter the **cable time-server** command in global configuration mode. To disable the time-of-day server function, use the **no** form of this command.

**cable time-server**

**no cable time-server**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no keywords or arguments. |
|---------------------------|--------------------------------------------|

|                        |          |
|------------------------|----------|
| <b>Command Default</b> | Disabled |
|------------------------|----------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

|                         |                                                                                                                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Per the DOCSIS specifications, the ToD server uses the UDP protocol, so UDP minor servers must also be enabled using the <b>service udp-small-servers max-servers no-limit</b> command. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Command History | Release   | Modification                 |
|-----------------|-----------|------------------------------|
|                 | 12.0(4)XI | This command was introduced. |

|                 |                                                                   |
|-----------------|-------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable the time-of-day server: |
|-----------------|-------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# service udp-small-servers max-servers no-limit
Router(config)# cable time-server
Router(config)#
```

# cable trust

To enable packets from trusted source MAC addresses in DHCP, use the **cable trust** command in global configuration mode. To remove a trusted MAC address from the MAC exclusion list, use the **no** form of this command. Removing a MAC address from the exclusion list subjects all packets from that source to standard DHCP source verification.

**cable trust** *mac-address*

**no cable trust** *mac-address*

|                           |                    |                                                                                                                            |
|---------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>mac-address</i> | The MAC address of a trusted DHCP source, and from which packets will not be subject to standard DHCP source verification. |
|---------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------|

|                 |          |
|-----------------|----------|
| <b>Defaults</b> | Disabled |
|-----------------|----------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

|                         |                                                                                                                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Per the DOCSIS specifications, the ToD server uses the UDP protocol, so UDP minor servers must also be enabled using the <b>service udp-small-servers max-servers no-limit</b> command. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Command History</b> | Release     | Modification                 |
|------------------------|-------------|------------------------------|
|                        | 12.3(13a)BC | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>This command and capability are only supported in circumstances in which the Cable Source Verify feature is first enabled on the Cisco CMTS.</p> <p>When this feature is enabled in addition to cable source verify, a packet's source must belong to the MAC Exclude list on the Cisco CMTS. If the packet succeeds this exclusionary check, then the source IP address is verified against Address Resolution Protocol (ARP) tables as per normal and previously supported source verification checks. The service ID (SID) and the source IP address of the packet must match those in the ARP host database on the Cisco CMTS. If the packet check succeeds, the packet is allowed to pass. Rejected packets are discarded in either of these two checks.</p> <p>Any trusted source MAC address in the optional exclusion list may be removed at any time. Removal of a MAC address returns previously trusted packets to non-trusted status, and subjects all packets to standard source verification checks on the Cisco CMTS.</p> |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Note**

When the **cable source-verify dhcp** feature is enabled, and a statically-defined IP address has been added to the CMTS for a CM using the **cable trust** command to override the **cable source-verify dhcp** checks for this device, packets from this CM will continue to be dropped until an entry for this CM is added to the ARP database of the CMTS. To achieve this, disable the **cable source-verify dhcp** feature, ping the CMTS from the CM to add an entry to the ARP database, and re-enable the **cable source-verify dhcp** feature.

For additional information about the enhanced Cable Source Verify DHCP feature, and general guidelines for its use, refer to the following documents on Cisco.com:

- *Filtering Cable DHCP Lease Queries on the Cisco CMTS*
- *DHCP and Time-of-Day Services on the Cisco CMTS*
- *IP Address Verification for the Cisco uBR7200 Series Cable Router*
- CABLE SECURITY, *Cable Source-Verify and IP Address Security*, White Paper

---

## Examples

The following example shows how to enable the time-of-day server:

```
Router# configure terminal
Router(config)# cable trust 0007.0e03.69f9
Router(config)# Ctrl^Z
Router#
```

# cable tx-power-headroom

To configure cable modems with the extended transmit power capability based on the Organizational Unique Identifier (OUI), use the **cable tx-power-headroom** command in global configuration mode. To disable this configuration, use the **no** form of this command.

**cable tx-power-headroom** *OUI* *dB-value*

**no cable tx-power-headroom** *OUI* *dB-value*

|                           |                 |                                                                                           |
|---------------------------|-----------------|-------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>OUI</i>      | First 24 bits of a MAC address that is unique to the cable modem vendor.                  |
|                           | <i>dB-value</i> | Decibel value for the upstream channel transmit power. The valid range is from 1 to 6 dB. |

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| <b>Command History</b> | <b>Release</b>                 | <b>Modification</b>          |
|------------------------|--------------------------------|------------------------------|
|                        | Cisco IOS Release 12.2(33)SCE3 | This command was introduced. |

|                         |                                                                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | You can use the <b>cable tx-power-headroom</b> command for each unique OUI. You can specify either the MAC address or the OUI value with this command. If you specify the MAC address, only its OUI value is saved. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to configure extended transmit power on the Cisco CMTS router in Cisco IOS Release 12.2(33)SCE3: |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# cable tx-power-headroom 0025.2ed0.8cba 3
```

| <b>Related Commands</b> | <b>Command</b>                              | <b>Description</b>                                                                                       |
|-------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------|
|                         | <b>cable upstream max-channel-power-off</b> | Specifies the power budget offset value on the Cisco CMTS router for the reduced channel set assignment. |
|                         | <b>show cable modem</b>                     | Displays transmit power values for each assigned upstream channel along with cable modem details.        |







## Cable Commands: cable u through cable w

Revised: August 12, 2013, OL-15510-17

### New Commands

| Command                                                      | Cisco IOS Software Release |
|--------------------------------------------------------------|----------------------------|
| <b>cable upstream rate-adapt (global)</b>                    | 12.3(23)BC2                |
| <b>cable upstream rate-adapt (interface)</b>                 | 12.3(23)BC2                |
| <b>cable upstream attribute-mask</b>                         | 12.2(33)SCB                |
| <b>cable upstream threshold hysteresis</b>                   | 12.3(23)BC7                |
| <b>cable upstream equalization-error-recovery</b>            | 12.3(23)BC7                |
| <b>cable upstream active-codes</b>                           | 12.2(33)SCC                |
| <b>cable upstream bonding-group</b>                          | 12.2(33)SCC                |
| <b>cable upstream codes-per-minislot</b>                     | 12.2(33)SCC                |
| <b>cable upstream max-codes-per-subframe</b>                 | 12.2(33)SCC                |
| <b>cable upstream max-interleave-step</b>                    | 12.2(33)SCC                |
| <b>cable upstream max-logical-chans</b>                      | 12.2(33)SCC                |
| <b>cable upstream ranging-poll</b>                           | 12.2(33)SCC                |
| <b>cable upstream resiliency</b>                             | 12.2(33)SCC                |
| <b>cable upstream spreading-interval</b>                     | 12.2(33)SCC                |
| <b>cable upstream qos wfq</b>                                | 12.2(33)SCD2               |
| <b>cable util-interval</b>                                   | 12.2(33)SCD2               |
| <b>cable upstream dpon</b>                                   | 12.2(33)SCE                |
| <b>cable upstream max-channel-power-offset</b>               | 12.2(33)SCE3               |
| <b>cable upstream rate-limit-bwreq<br/>exempted-priority</b> | 12.2(33)SCF                |
| <b>cable upstream rf-adapt</b>                               | 12.2(33)SCF                |
| <b>cable upstream rf-adapt(logical channel)</b>              | 12.2(33)SCF                |
| <b>cable upstream threshold rf-adapt</b>                     | 12.2(33)SCF                |
| <b>cable vrf-steering cable-modem</b>                        | 12.2(33)SCF                |

| Command                             | Cisco IOS Software Release |
|-------------------------------------|----------------------------|
| <b>cable upstream ext-power</b>     | 12.2(33)SCF2               |
| <b>cable upstream chan-class-id</b> | 12.2(33)SCH                |
| <b>cable upstream rng-holdoff</b>   | 12.2(33)SCH                |
| <b>cable udc-capability</b>         | 12.2(33)SCG5               |

#### Modified Commands

| Command                                           | Cisco IOS Software Release |
|---------------------------------------------------|----------------------------|
| <b>cable wideband auto-reset</b>                  | 12.3(23)BC                 |
| <b>cable upstream modulation</b>                  | 12.3(23)BC7                |
| <b>cable upstream equalization-error-recovery</b> | 12.2(33)SCB4               |
| <b>cable upstream channel-width</b>               | 12.2(33)SCC                |
| <b>cable upstream docsis-mode</b>                 | 12.2(33)SCC                |
| <b>cable upstream modulation-profile</b>          | 12.2(33)SCC                |
| <b>cable upstream shutdown</b>                    | 12.2(33)SCC                |
| <b>cable upstream threshold</b>                   | 12.2(33)SCC                |
| <b>cable upstream max-ports</b>                   | 12.2(33)SCE                |
| <b>cable upstream ranging-init-technique</b>      | 12.2(33)SCE                |
| <b>cable upstream connector</b>                   | 12.2(33)SCE                |
| <b>cable upstream rate-limit-ccf</b>              | 12.2(33)SCF                |
| <b>cable upstream threshold</b>                   | 12.2(33)SCF                |
| <b>cable upstream threshold hysteresis</b>        | 12.2(33)SCF                |
| <b>cable upstream load-balance group</b>          | 12.2(33)SCE4               |
| <b>cable upstream resiliency</b>                  | 12.2(33)SCG                |
| <b>cable upstream docsis-mode</b>                 | 12.2(33)SCG                |
| <b>cable upstream channel-width</b>               | 12.2(33)SCG2               |
| <b>cable upstream docsis-mode</b>                 | 12.2(33)SCG2               |

# cable udc-capability

To enable the Upstream Drop Classifier (UDC) feature on cable modems, use the **cable udc-capability** command in interface configuration mode. To disable the UDC feature, use the **no** form of this command.

**cable udc-capability**

**no cable udc-capability**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Disabled.

## Command Modes

Interface configuration (config-if)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCG5 | This command was introduced. |

## Usage Guidelines

This command is used in the MAC domain. When this command is used on a particular interface, the UDC feature for all the cable modems on that interface is enabled.

## Examples

The following example shows how to configure the **cable udc-capability** command:

```
Router# configure terminal
Router(config)# interface cable 7/1/0
Router(config-if)# cable udc-capability
```

## Associated Features

The **cable udc-capability** command is used to configure the Upstream Drop Classifier (UDC) feature on Cisco CMTS. For more information on the UDC feature, refer to the [Configuring Upstream Cable Interface Features on the Cisco CMTS Routers](#) guide.

## Related Commands

| Command                 | Description                                                            |
|-------------------------|------------------------------------------------------------------------|
| <b>show cable modem</b> | Displays information for the registered and unregistered cable modems. |

# cable upstream active-codes

To specify the number of active codes that can be configured on an upstream channel, use the **cable upstream active-codes** command in cable interface configuration mode. To set the default value of active codes to 112 when ingress noise cancellation is enabled and to 128 when it is disabled, use the **no** form of this command.

**cable upstream *n* active-codes *active-code***

**no cable upstream *n* active-codes**

|                    |                    |                                                                                                                                                                                                                          |
|--------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i>           | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                     |
|                    | <i>active-code</i> | Specifies the number of active codes. Valid values are from 64 to 128, with a default value of 112, when ingress noise cancellation is enabled; and a default value of 128, when ingress noise cancellation is disabled. |

|                 |                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------|
| Command Default | The active-code setting cannot be applied if the Synchronous Code Division Multiple Access (S-CDMA) is not configured. |
|-----------------|------------------------------------------------------------------------------------------------------------------------|

|               |                                     |
|---------------|-------------------------------------|
| Command Modes | Interface configuration (config-if) |
|---------------|-------------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

|                  |                                                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command is applicable only for S-CDMA channels. You should configure S-CDMA to apply the active-code setting. |
|------------------|--------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                       |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example sets the active code to 128 on upstream port 0:</p> <pre>Router(config)# interface cable 7/0/4 Router(config-if)# cable upstream 0 active-codes 128 Router(config-if)#</pre> |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                                  | Description                                                                  |
|------------------|------------------------------------------|------------------------------------------------------------------------------|
|                  | <b>cable upstream codes-per-minislot</b> | Specifies the number of codes per minislot allowed on an upstream channel.   |
|                  | <b>cable upstream spreading-interval</b> | Specifies the spreading interval for S-CDMA channels on an upstream channel. |

# cable upstream admission-control

To specify the percentage overbooking rate that is allowed on an upstream channel, use the **cable upstream admission-control** command in cable interface configuration mode. To set overbooking rate to its default of 100 percent, use the **no** form of this command.

**cable upstream** *n* **admission-control** *percentage*

**no cable upstream** *n* **admission-control**

|                           |                   |                                                                                                                                          |
|---------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i>          | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card.                     |
|                           | <i>percentage</i> | Specifies the percentage overbooking rate to limit overbooking. Valid values are from 10 to 1000 percent, with a default of 100 percent. |

|                        |             |
|------------------------|-------------|
| <b>Command Default</b> | 100 percent |
|------------------------|-------------|

|                      |                                                |
|----------------------|------------------------------------------------|
| <b>Command Modes</b> | Interface configuration (cable interface only) |
|----------------------|------------------------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 11.3(6) NA     | This command was introduced. |

**Usage Guidelines**

This command limits the maximum number of CMs for a given upstream port by looking at the minimum guaranteed upstream bandwidth allocated to each CM. Cable modems providing residential services and commercial services can be given different weights according to their traffic needs. This command affects only whether CMs can register with the CMTS—it does not affect CMs that have already come online.

The CMTS uses the minimum guaranteed upstream bandwidth field from the CM's DOCSIS configuration file to calculate whether the CM can come online or not. If the CM's minimum guaranteed upstream bandwidth would exceed the total upstream bandwidth multiplied by the overbooking percentage specified by this command, the CM cannot come online on that upstream. The CM will attempt to find another upstream, and if it cannot register on any upstreams, it will attempt to lock on to a new downstream.

**Note**

A CM with a guaranteed upstream bandwidth does not consume that bandwidth unless it has active traffic. By guaranteeing a CM a minimum upstream bandwidth, individual customers are assured of never being totally shut out from network access in a very high-traffic situation.

Table 0-1 shows the approximate bandwidth for each upstream channel, depending on channel width, symbol rate, and modulation type, when admission control is used at 100 percent. When setting admission control to other values, scale the bandwidth values in Table 0-1 accordingly, so as to plan for the maximum number of CMs effectively allowed per upstream port.

**Table 0-18 Admission Control Bandwidth Table**

| Channel Width (KHz) | Symbol Rate (Ksym/sec) | QPSK Virtual Channel Bandwidth—100% limit (bits/sec) | 16 QAM Virtual Channel Bandwidth—100% limit (bits/sec) |
|---------------------|------------------------|------------------------------------------------------|--------------------------------------------------------|
| 200                 | 160                    | 320,000                                              | 640,000                                                |
| 400                 | 320                    | 640,000                                              | 1,280,000                                              |
| 800                 | 640                    | 1,280,000                                            | 2,560,000                                              |
| 1600                | 1280                   | 2,560,000                                            | 5,120,000                                              |
| 3200                | 2560                   | 5,120,000                                            | 10,240,000                                             |

For example, with a 3.2 MHz channel width and QPSK modulation, the total bandwidth is approximately 5 Mbps. This is the maximum allowable bandwidth that can be allocated to CMs at the default admission rate of 100%. If each CM is allocated a minimum upstream bandwidth of 128 kbps, this means a maximum of 40 CMs will be allowed to come online.

To verify whether or not upstream admission control is configured and activated, use the **show interface** command for a cable upstream to display its configuration information. If upstream admission control is configured and enabled, the output contains an entry stating “CIR admission control enforced.” If upstream admission control is disabled, no admission control entry is displayed in the output.

**Note**

Setting the admission control limit to below the current total reserved bandwidth for the channel does not immediately force any CMs offline, but may prevent CMs from reconnecting if they drop offline at a later time. Increasing the admission control limit allows more CMs to connect.

When an upstream becomes overbooked, use the **test cable ucc** command to move a cable modem that is currently online from one upstream port to another. For example, the following example shows that the cable modem with the IP address of 10.128.1.128 is being moved from port C3/0/U0 to C3/0/U1:

```
Router# show cable modem 10.128.1.128
Interface Prim Online Timing Rec QoS CPE IP address MAC address
 Sid State Offset Power
Cable3/0/U0 101 online 1919 5.25 7 0 10.128.1.128 0030.1976.7067

Router# test cable ucc c3/0 101 1

Router# show cable modem 10.128.1.128
Interface Prim Online Timing Rec QoS CPE IP address MAC address
 Sid State Offset Power
Cable3/0/U1 101 online 1920 5.25 7 0 10.128.1.128 0030.1976.7067
```

**Examples**

The following example shows overbooking on upstream port 4 being limited to 125 percent:

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 4 admission-control 125
Router(config-if)#
```

Use the **show interface cable upstream** command to display the current status of admission control on an interface. For example, the following command output shows that this upstream has allocated a total bandwidth of 2.5 Mbit/sec to those online CMs that were assigned a guaranteed upstream bandwidth in their DOCSIS configuration files.

This displays also shows that the admission control is being enforced at a subscription level of 125 percent. The Virtual channel BW field is computed by multiplying channel bandwidth by the admission control limit. The Admissions requests rejected counter shows the number of cable modems that attempted to register but were refused because of the admission control policy.

Router# **show interface c3/0 u4**

```
Cable3/0: Upstream 4 is up
 Received 11585 broadcasts, 11854 multicasts, 3222651 unicasts
 0 discards, 829 errors, 0 unknown protocol
 3246090 packets input, 5 uncorrectable
 557 noise, 0 microreflections
 Total Modems On This Upstream Channel : 69 (68 active)
 Default MAC scheduler
 Queue[Rng Polls] 0/64, fifo queueing, 0 drops
 Queue[Cont Mslots] 0/52, fifo queueing, 0 drops
 Queue[CIR Grants] 0/64, fair queueing, 0 drops
 Queue[BE Grants] 0/64, fair queueing, 0 drops
 Queue[Grant Shpr] 0/64, calendar queueing, 0 drops
 Reserved slot table currently has 0 CBR entries
 Req IEs 205196036, Req/Data IEs 0
 Init Mtn IEs 7604617, Stn Mtn IEs 422496
 Long Grant IEs 4848, Short Grant IEs 1646196
 Avg upstream channel utilization : 1%
 Avg percent contention slots : 94%
 Avg percent initial ranging slots : 1%
 Avg percent minislots lost on late MAPs : 0%
 Total channel bw reserved 2500000 bps
 CIR admission control enforced
 Subscription level 125%
 Virtual channel bw 6400000 bps
 Admission requests rejected 32
 Current minislot count : 5200298 Flag: 0
 Scheduled minislot count : 5200420 Flag: 0
```

Router#

If a CM is denied access due to the admission control policy, its entry in the **show cable modem** command output shows “reject(c)”:

Router# **show cable modem**

| Interface   | Prim<br>Sid | Online<br>State | Timing<br>Offset | Rec<br>Power | QoS | CPE | IP address   | MAC address    |
|-------------|-------------|-----------------|------------------|--------------|-----|-----|--------------|----------------|
| Cable2/0/U0 | 1           | online          | 2288             | 0.50         | 4   | 0   | 10.16.30.66  | 0010.7bb3.fb45 |
| Cable2/0/U0 | 2           | online          | 2288             | 0.50         | 4   | 0   | 10.16.30.68  | 0010.7bb3.fb7b |
| Cable2/0/U0 | 3           | init(i)         | 2280             | 0.00         | 2   | 0   | 10.16.30.69  | 0010.9500.05e  |
| . . .       |             |                 |                  |              |     |     |              |                |
| Cable3/0/U1 | 113         | online          | 3921             | 0.00         | 5   | 0   | 10.128.1.108 | 0030.9433.c38b |
| Cable3/0/U1 | 114         | online          | 3920             | 0.25         | 6   | 0   | 10.128.1.87  | 0030.1976.6ebf |
| Cable3/0/U0 | 115         | reject(c)       | 3922             | 0.25         | 2   | 0   | 10.128.1.75  | 0030.1976.703b |
| Cable3/0/U0 | 116         | online          | 3919             | 0.75         | 5   | 0   | 10.128.1.57  | 0030.1976.6fa1 |

## Related Commands

| Command                          | Description                                                                          |
|----------------------------------|--------------------------------------------------------------------------------------|
| <b>debug cable mac-scheduler</b> | Displays information for the MAC layer's scheduler and admission control activities. |
| <b>debug cable us-adm-ctrl</b>   | Displays debug messages for upstream admission control activity.                     |

|                                      |                                                                                                                    |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>show cable modem</b>              | Displays statistics for a CM, including its upstream port and primary SID.                                         |
| <b>show interface cable upstream</b> | Displays the interface configuration, which for an upstream includes the current admission control policy, if any. |



# cable upstream attribute-mask

To specify an upstream attribute mask in hexadecimal format, use the **cable upstream attribute-mask** command in cable interface configuration mode. Use the **no** form of this command to set default value to upstream channel attribute mask.

**cable upstream attribute-mask** *attribute-mask*

**no cable upstream** *upstream attribute-mask attribute-mask*

## Syntax Description

|                       |                                                            |
|-----------------------|------------------------------------------------------------|
| <i>upstream</i>       | Specifies the upstream port.                               |
| <b>attribute-mask</b> | Specifies the attribute mask bitmap in hexadecimal format. |
| <i>attribute-mask</i> | Example: 0-FFFFFFFF                                        |

## Command Default

If the router is not high availability (HA) supported and the upstream is not bonded, the default value for cable upstream attribute mask is 0x00.

If the router is HA supported, the default value is 0x20000000.

If the upstream channel is part of a bonding group, the default value is 0x80000000.

If the router is HA supported and the upstream channel is part of a bonding group, the default value is 0xA0000000.

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

This command sets the attribute mask of upstream channel.

## Examples

The following example shows how to set upstream attribute mask in hexadecimal format:

```
Router(config-if)# cable upstream 0 attribute-mask ffff
```

## Related Commands

| Command                                  | Description                                          |
|------------------------------------------|------------------------------------------------------|
| <b>clear cable modem attribute-masks</b> | This command clears the cable modem attribute masks. |

# cable upstream bonding-group

To create a static upstream bonding group on a cable interface, use the **cable upstream bonding-group** command in cable interface configuration mode. To disable this configuration, use the **no** form of this command.

```

cable upstream bonding-group id

no cable upstream bonding-group id

```

|                    |                                                                                      |
|--------------------|--------------------------------------------------------------------------------------|
| Syntax Description | <i>id</i> Bonding group ID on the cable interface. Valid values are from 1 to 65535. |
|--------------------|--------------------------------------------------------------------------------------|

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                                     |
|---------------|-------------------------------------|
| Command Modes | Interface configuration (config-if) |
|---------------|-------------------------------------|

| Command History | Release     | Modification                                                  |
|-----------------|-------------|---------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

Usage Guidelines

You can configure up to 32 static upstream bonding groups for each Media Access Control (MAC) domain. If you delete an upstream bonding group using the **no** form of the command, the Cisco CMTS router enforces the bonded upstream service flows associated with the deleted upstream bonding group to readmit.

Under the upstream bonding configuration submode, you can specify the following for an upstream bonding group:

- Upstream channels
- Bandwidth reservation
- Provisioned attribute masks

Examples

The following example shows how to configure an upstream bonding group on a cable interface in slot 7, subslot 1, and port 0 on a Cisco uBR10012 router:

```

Router# configure terminal
Router(config)# interface cable 7/1/0
Router(config-if)# cable upstream bonding-group 235

```

| Related Commands | Command                         | Description                                                          |
|------------------|---------------------------------|----------------------------------------------------------------------|
|                  | <b>upstream cable connector</b> | Specifies the upstream channel ports for a fiber node.               |
|                  | <b>cable fiber-node</b>         | Creates a fiber node and enters cable fiber-node configuration mode. |

# cable upstream chan-class-id

To configure a channel class ID for a logical upstream channel on the CMTS router, use the **cable upstream chan-class-id** command in cable interface configuration mode. To disable the channel class ID configuration, use the **no** form of this command.

**cable upstream** *port-number* **chan-class-id** *id*

**no cable upstream** *port-number* **chan-class-id** *id*

## Syntax Description

|                    |                                                                                                                                                                                                                                                             |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>port-number</i> | Cable upstream port number. The valid range depends on the number of upstream channels configured in a MAC domain. For example, if the total number of upstream channels configured is 4, then the valid range for the upstream port number is from 0 to 3. |
| <i>id</i>          | Channel class ID for the logical upstream channel in the hexadecimal format. The valid range is from 0 to fffffff. The default value is 0.                                                                                                                  |

## Command Default

None

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCH | This command was introduced. |

## Usage Guidelines

An upstream channel descriptor (UCD) message includes type, length, value (TLV) 18 and 19 for an upstream logical channel based on the channel class ID and ranging hold-off priority configuration. If a channel class ID is not configured, the UCD does not include TLV18 and 19 irrespective of the ranging hold-off priority configuration.

## Examples

The following example shows how to configure a channel class ID for a logical upstream channel on a cable interface line card on the cisco uBR10012 router:

```
Router# config terminal
Router(config)# interface cable 5/0/0
Router(config-if)# cable upstream 0 chan-class-id ff
```

## Associated Features

The **cable upstream chan-class-id** command is associated with the [CM Steering on the Cisco CMTS Routers](#) feature.

| Related Commands | Command                           | Description                                                                                                |
|------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance exclude</b> | Excludes a cable modem or a group of cable modems from DOCSIS load balance.                                |
|                  | <b>cable upstream rng-holdoff</b> | Configures an upstream ranging hold-off priority value for an upstream logical channel on the CMTS router. |
|                  | <b>show cable modem verbose</b>   | Displays information about the registered and unregistered cable modems connected to the CMTS router.      |

# cable upstream channel-width

To specify an upstream channel width for an upstream port, use the **cable upstream channel-width** command in cable interface configuration mode. To set the channel width back to the default setting of 1,600,000 Hz, use the **no** form of this command.

**cable upstream *n* channel-width *first-choice-width* [*last-choice-width*]**

**no cable upstream *n* channel-width**

## Syntax Description

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                  | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                                                                                                                                                                             |
| <i>first-choice-width</i> | Specifies the upstream channel width in hertz (Hz). Valid values for all cards are displayed in <a href="#">Table 19</a> .                                                                                                                                                                                                                                                                                              |
| <i>last-choice-width</i>  | (Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR-MC5X20S/U/H only)<br><br>The upstream channel width in hertz. The valid values are the same as those for the <i>first-choice-width</i> parameter, but for proper operation, the <i>last-choice-width</i> should be equal to or less than the <i>first-choice-width</i> value. Use this parameter with supported cards to enable symbol rate management algorithms. |

## Command Default

The *first-choice-width* value and the *last-choice-width* value default to 1,600,000 Hz. When an upstream channel is configured to operate in DOCSIS 2.0 A-TDMA or DOCSIS 3.0 S-CDMA-mode, only three channel width options (1.6 Mhz, 3.2 Mhz, and 6.4 Mhz) are available.

## Command Modes

Interface configuration (config-if)

## Command History

| Release                    | Modification                                                                                                                                                                         |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3(5)NA                  | This command was introduced.                                                                                                                                                         |
| 12.0(4)XI                  | The <i>last-choice-width</i> argument was added.                                                                                                                                     |
| 12.2(11)CY,<br>12.2(11)BC3 | Support was added for the Cisco uBR10-MC5X20S cable interface line card on the Cisco uBR10012 router.                                                                                |
| 12.2(15)CX                 | Support was added for the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line card, including DOCSIS 2.0 A-TDMA and mixed modulation profiles using 6.4 MHz channel widths. |
| 12.2(15)BC2                | Support was added for DOCSIS 2.0 A-TDMA and mixed modulation profiles using 6.4 MHz channel widths on the Cisco uBR-MC5X20S/U cable interface line cards.                            |
| 12.3BC                     | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                           |
| 12.2(33)SCA                | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                      |

| Release      | Modification                                                                     |
|--------------|----------------------------------------------------------------------------------|
| 12.2(33)SCC  | Support was added for Cisco UBR10-MC20X20V cable interface line card.            |
| 12.2(33)SCG2 | Support was added for Copy and Paste Support for TDMA to A-TDMA Upgrade feature. |

**Usage Guidelines**

The *last-choice-width* parameter is supported only by the Cisco uBR-MC16S, Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR-MC5X20S/U cable interface line cards. When one of these particular cards is installed, the system attempts to increase the channel width from the smallest channel width value to the largest channel width value.

When you specify both channel width values, the smaller value is taken as the *last-choice-width* parameter and the larger value is taken as the *first-choice-width* parameter. In the event of noise in the channel, the symbol rate automatically steps down to a value that is lower than the *first-choice-width* and greater or equal to the *last-choice-width* to maintain a stable channel.

**Table 19 Supported Channel Widths and DOCSIS Modes for Cable Interfaces**

| Cable Interface                                       | Channel Width                                                  | DOCSIS 1.X (TDMA)           | Mixed DOCSIS 1.X/2.0           | DOCSIS 2.0 (A-TDMA)            | DOCSIS 2.0 (S-CDMA)            | DOCSIS 3.0 (S-CDMA)          |
|-------------------------------------------------------|----------------------------------------------------------------|-----------------------------|--------------------------------|--------------------------------|--------------------------------|------------------------------|
| Cisco uBR-MC16U/X <sup>1</sup> ,<br>Cisco uBR-MC28U/X | 6.4 MHz<br>3.2 MHz<br>1.6 MHz<br>800 kHz<br>400 kHz<br>200 kHz | 41 to 50<br>(default is 41) | 141 to 150<br>(default is 141) | 241 to 250<br>(default is 241) | N/A                            | N/A                          |
| Cisco uBR-MC5X20S/U/H                                 | 6.4 MHz<br>3.2 MHz<br>1.6 MHz<br>800 kHz<br>400 kHz<br>200 kHz | 21 to 30<br>(default is 21) | 121 to 130<br>(default is 121) | 221 to 230<br>(default is 221) | N/A                            | N/A                          |
| Cisco uBR-MC20X20 <sup>2</sup>                        | 6.4 MHz<br>3.2 MHz<br>1.6 MHz<br>800 kHz<br>400 kHz<br>200 kHz | 21 to 30<br>(default is 21) | 121 to 130<br>(default is 121) | 221 to 230<br>(default is 221) | 321 to 330<br>(default is 321) | 1 to 400<br>(default is 381) |

| Cable Interface    | Channel Width                                                  | DOCSIS 1.X (TDMA)           | Mixed DOCSIS 1.X/2.0           | DOCSIS 2.0 (A-TDMA)            | DOCSIS 2.0 (S-CDMA)            | DOCSIS 3.0 (S-CDMA)          |
|--------------------|----------------------------------------------------------------|-----------------------------|--------------------------------|--------------------------------|--------------------------------|------------------------------|
| Cisco uBR-MC88U    | 6.4 MHz<br>3.2 MHz<br>1.6 MHz<br>800 kHz<br>400 kHz<br>200 kHz | 21 to 30<br>(default is 21) | 121 to 130<br>(default is 121) | 221 to 230<br>(default is 221) | 321 to 330<br>(default is 321) | 1 to 400<br>(default is 381) |
| Cisco uBR-MC3GX60V | 6.4 MHz<br>3.2 MHz<br>1.6 MHz<br>800 kHz<br>400 kHz<br>200 kHz | 21 to 30<br>(default is 21) | 121 to 130<br>(default is 121) | 221 to 230<br>(default is 221) | 321 to 330<br>(default is 321) | 1 to 400<br>(default is 381) |

1. Supports 6,400,000 Hz (5,120,000) symbols/sec) while operating in the DOCSIS 2.0 (A-TDMA-only) mode.
2. The DOCSIS 3.0 S-CDMA modulation profiles do not support 200 kHz, 400 kHz, and 800 kHz channel widths. This applies to Cisco uBR-MC88U and Cisco uBR-MC3GX60V.

**Note**

The UBR-MC20X20V cable interface line card has three variants, UBR-MC20X20V-0D, UBR-MC20X20V-5D, and UBR-MC20X20V-20D. The UBR-MC20X20V-0D line card supports 20 upstreams and zero (no) downstreams. The UBR-MC20X20V-5D line card supports 20 upstreams and five downstreams, and the UBR-MC20X20V-20D line card supports 20 upstreams and 20 downstreams.

**Note**

In Cisco IOS Release 12.2(15)BC1 and later releases, changing the channel width could force a frequency hop, if the current frequency does not fit within the new channel width parameters, or if the system needs to reset the fixed frequency or shared frequency group parameters to match the new channel width.

**Caution**

In DOCSIS 1.X networks, do not change the channel width more than one step at a time on an interface that has cable modems that are currently online. The DOCSIS 1.X specifications require that cable modems remain online when the channel width is changed in single step increments (such as 800,000 to 1,600,000 Hz), but cable modems can go offline when you change the channel width in larger amounts (such as changing it from 800,000 to 3,200,000 Hz). To check if the DOCSIS 2.0 cable modems support changing the channel width by two steps, test each brand of modem before attempting it on a live network. Also, after changing the channel width, do not change the channel width again until all cable modems have performed their ranging adjustments for the new width (which could take up to a minute, depending on the number of cable modems).

**Note**

To specify only one channel width for the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, or Cisco uBR-MC5X20S/U/H card, specify the same value for both the *first-choice-width* and *last-choice-width* parameters. For example:

```
cable upstream 0 channel-width 800000 800000
```

When using this command to change channel-widths for an upstream interface on the Cisco uBR-MC5X20S cable interface line card, some DOCSIS 1.1 CMs can go offline if you do not change the minislots size to the corresponding value. See the following examples for the correct channel-width and minislots pairings:

```
Router(config-if) # cable upstream 0 channel-width 3200000
Router(config-if) # cable upstream 0 minislots 4
```

```
Router(config-if) # cable upstream 0 channel-width 1600000
Router(config-if) # cable upstream 0 minislots 8
```

```
Router(config-if) # cable upstream 0 channel-width 800000
Router(config-if) # cable upstream 0 minislots 16
```

```
Router(config-if) # cable upstream 0 channel-width 400000
Router(config-if) # cable upstream 0 minislots 32
```

```
Router(config-if) # cable upstream 0 channel-width 200000
Router(config-if) # cable upstream 0 minislots 64
```

**Note**

This limitation does not affect DOCSIS 1.1-compliant CMs. Also, in Cisco IOS Release 12.2(15)CX, Cisco IOS Release 12.2(15)BC2, and later releases, there is no need to manually change the minislots size on the Cisco uBR-MC16U/X, Cisco uBR-MC28C, and Cisco uBR-MC28U/X cards. These cards automatically change the minislots size when the channel width is changed, to produce 32 symbols per minislots.

**Note**

Starting with Cisco IOS 12.2(33)SCG2, when the channel-width value in the **cable upstream channel-width** command is specified as 6.4 MHz in the TDMA or mixed TDMA/A-TDMA mode, the DOCSIS mode automatically changes to A-TDMA-only (DOCSIS 2.0) mode.

**PacketCable Limitations**

The 200,000 Hz channel width cannot be used on:

- Upstreams that support PacketCable voice calls
- Upstreams that use Unsolicited Grant Service (UGS) or UGS with Activity Detection (UGS-AD) service flows.

Using this small channel width with voice and other UGS/UGS-AD service flows results in rejected calls because of “DSA MULTIPLE ERRORS”.

**Examples**

The following example shows the upstream port 2 on a Cisco uBR-MCXXC card being configured with a channel width of 200,000 Hz (which is equivalent to a symbol rate of 160 kilosymbols/second):

```
Router(config-if) # cable upstream 2 channel-width 200000
Router(config-if) #
```

The following example shows the upstream port 2 on a Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, or Cisco uBR-MC5X20S card being configured with a channel width of 200,000 Hz (which is equivalent to a symbol rate of 160 kilosymbols/second):

```
Router(config-if) # cable upstream 2 channel-width 200000 200000
Router(config-if) #
```



The following example shows the upstream port 3 being configured to step from a channel width of 1,600,000 Hz to a channel width of 3,200,000 Hz in increments of 200,000 Hz:

```
Router(config-if)# cable upstream 3 channel-width 1600000 3200000
Router(config-if)#
```

The following example shows an upstream port on a Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, Cisco uBR-MC5X20S, Cisco uBR-MC20X20V, Cisco uBR-MC88U or Cisco uBR-MC3GX60V card being configured with a channel width of 6.4 MHz, which is supported only in DOCSIS 2.0 A-TDMA-only mode:

```
Router(config-if)# cable upstream 0 channel-width 6400000
Router(config-if)#
```

The following example shows an upstream port on Cisco uBR-MC5X20H, Cisco uBR-MC20X20V, Cisco uBR-MC88U, Cisco uBR-MC3GX60V line cards being configured with a channel width of 6.4 MHz in DOCSIS 3.0 S-CDMA mode:

```
Router(config-if)# cable upstream 0 channel-width 6400000
Router(config-if)#
```

#### Related Commands

| Command                                  | Description                                                                                                 |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>cable upstream hopping blind</b>      | Disables optimum frequency hopping on the Cisco uBR-MC16S and Cisco uBR-MC5X20S cable interface line cards. |
| <b>cable upstream minislot-size</b>      | Specifies the minislot size for a specific upstream interface.                                              |
| <b>cable upstream modulation-profile</b> | Overrides modulation types specified in the modulation profile for the specified upstream channel.          |
| <b>cable upstream docsis-mode</b>        | Configures an upstream to use either DOCSIS 1.x or DOCSIS 2.0 modulation profiles.                          |

# cable upstream codes-per-minislot

To specify the number of codes-per-minislot allowed on an upstream channel, use the **cable upstream codes-per-minislot** command in cable interface configuration mode. To set the default values to the codes-per-minislot, which depend on the setting of the **cable upstream spreading-interval** command, use the **no** form of this command.

**cable upstream** *n* **codes-per-minislot** *code*

**no cable upstream** *n* **codes-per-minislot**

|                           |             |                                                                                                                      |
|---------------------------|-------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i>    | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card. |
|                           | <i>code</i> | Specifies the number of codes-per-minislot. Valid values range from 2 to 32.                                         |

|                        |                                                                                                                                                                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | The codes-per-minislot setting cannot be applied if the Synchronous Code Division Multiple Access (S-CDMA) is not configured. The default value of codes-per-minislot depends on the setting of the <b>cable upstream spreading-interval</b> command. |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCC    | This command was introduced. |

|                         |                                                                                                                                                       |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command limits the maximum number of codes-per-minislot for a given upstream port. You should configure S-CDMA to apply the active-code setting. |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                |
|-----------------|--------------------------------------------------------------------------------|
| <b>Examples</b> | The following example sets the codes-per-minislot to 8 on the upstream port 0: |
|-----------------|--------------------------------------------------------------------------------|

```
Router(config)# interface cable 7/1/0
Router(config-if)# cable upstream 0 codes-per-minislot 8
Router(config-if)#
```

| <b>Related Commands</b> | <b>Command</b>                           | <b>Description</b>                                                                  |
|-------------------------|------------------------------------------|-------------------------------------------------------------------------------------|
|                         | <b>cable upstream active-codes</b>       | Specifies the number of active codes that can be configured on an upstream channel. |
|                         | <b>cable upstream spreading-interval</b> | Specifies the spreading interval for SCDMA on an upstream channel.                  |

# cable upstream concatenation

To enable DOCSIS concatenation at the CMTS, use the **cable upstream concatenation** command in cable interface configuration mode. To turn off concatenation, use the **no** form of this command.

**cable upstream *n* concatenation**

**no cable upstream *n* concatenation**

|                           |          |                                                                                                                             |
|---------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i> | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card. |
|---------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------|

|                        |                          |
|------------------------|--------------------------|
| <b>Command Default</b> | Concatenation is enabled |
|------------------------|--------------------------|

|                      |                                                |
|----------------------|------------------------------------------------|
| <b>Command Modes</b> | Interface configuration (cable interface only) |
|----------------------|------------------------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.0(7)XR2     | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>Concatenation is part of DOCSIS 1.0 extension support. Concatenation provides for improved bandwidth efficiency but must be supported at both the headend CMTS and the CM.</p> <p>DOCSIS concatenation combines multiple upstream packets into one packet to reduce packet overhead and overall latency and increase transmission efficiency. Using concatenation, a DOCSIS CM needs to make only one bandwidth request for a concatenated packet, compared to making bandwidth requests for each individual packet. This technique is especially effective for bursty real-time traffic such as voice calls.</p> <p>Concatenation support improves upstream per CM data throughput. The Cisco CMTS radio frequency (RF) line card driver can receive only one MAC frame in a data burst. Thus the CM must make explicit bandwidth requests for every packet it sends upstream. This limits the maximum upstream data throughput received by the CM due to the inherent request-to-grant round-trip latency of the hybrid fiber-coaxial (HFC) cable system incurred by every packet. To increase this per-CM upstream throughput, the Cisco CMTS driver has been enhanced to receive a concatenated burst of multiple MAC frames from the same CM.</p> |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Note**

Concatenation is not supported on the Cisco uBR-MC11 FPGA and Cisco uBR-MC16B cable interface line cards.

|                 |                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable concatenation for CMs on upstream port 2 on the cable interface in slot 3/0: |
|-----------------|------------------------------------------------------------------------------------------------------------------------|

```
Router(config)# interface c3/0
Router(config-if)# cable upstream 2 concatenation
```

# cable upstream connector

To map a MAC domain upstream port to a physical port on the Cisco cable interface line cards (Cisco uBR-MC5X20U/H, Cisco uBR-MC20X20V, Cisco uBR-MC88V, Cisco uBR-MC28U, or Cisco uBR-MC3GX60V), use the **cable upstream connector** command in cable interface configuration mode. To remove the mapping, use the **no** form of this command.

**cable upstream port connector** *physical-port* **shared**

**no cable upstream port connector** *physical-port* **shared**

|                           |                      |                                                                                                                                                                                                                                                                         |
|---------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>port</i>          | Index of the MAC domain upstream. The index range is configured with the <b>cable upstream max-ports</b> <i>n</i> command, and the valid range is 0 to <i>n</i> -1.                                                                                                     |
|                           | <i>physical-port</i> | Index of the actual physical port to be mapped.<br><br>The valid range for Cisco uBR-MC520U/H, Cisco uBR-MC20X20V, and Cisco uBR-MC3GX60V cable line cards is from 0 to 19.<br>The valid range for Cisco uBR-MC28U and Cisco uBR-MC88V cable line cards is from 0 to 7. |
|                           | <b>shared</b>        | Indicates that the connector is shared by multiple upstream ports.                                                                                                                                                                                                      |
|                           | <b>Note</b>          | This option is not valid for Cisco uBR-MC3GX60V cable interface line card on Cisco IOS Release 12.2(33)SCE and later releases. A connector becomes shared automatically when multiple upstream ports are mapped to it.                                                  |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | By default, each MAC domain has four upstream ports allocated. For all the currently supported cable line cards—Cisco uBR-MC5X20U/H, Cisco uBR-MC20X20V, Cisco uBR-MC88V, Cisco uBR-MC28U, and Cisco uBR-MC3GX60V the default mapping is four upstream for each MAC domain.<br><br>For the Cisco uBR-MC5X20U/H and Cisco uBR-MC28U cable line cards, each MAC domain has one downstream and four upstreams. For the other cards, each MAC domain can have multiple downstreams. |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

|                        |                |                                                                                                                                                                                                                  |
|------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                              |
|                        | 12.2(15)BC1    | This command was introduced to support the Cisco uBR-MC5X20S cable interface line card.                                                                                                                          |
|                        | 12.2(15)BC2    | Support was added for the Cisco uBR-MC5X20U card. Also, the entAliasMappingTable in the ENTITY-MIB was updated to show the mapping between the physical upstream connectors and the logical upstream connectors. |
|                        | 12.2(33)SCE    | Support for the <b>shared</b> keyword was removed.                                                                                                                                                               |

**Usage Guidelines**

The **cable upstream connector** command maps a MAC domain upstream port to a particular physical RF port on the cable line card front panel. For all cable line cards except the Cisco uBR-MC3GX60V, the default mapping assigns one upstream port to one physical port. The default mapping of Cisco uBR-MC3GX60V cable line card assigns four upstream ports to one physical port. The physical ports are mapped sequentially in the order in which they appear on the front panel.

The **no** version of this command removes the upstream port mapping and shuts down the upstream port. The port must be remapped to another physical port before it can come online again.

**Tip**

Use the **cable upstream max-ports** command to set the maximum number of upstream ports per MAC domain before using the **cable upstream connector** command.

Table 20 and Table 21 show the default port mapping.

**Table 20** Default Upstream Port Assignments for the Cisco uBR-MC5X20U/H Cable Interface Line Card

| Physical Ports (upstream, as labeled on the card) |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |
|---------------------------------------------------|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|
| Physical Upstream Ports                           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| MAC Domain 0 Upstream                             | 0 | 1 | 2 | 3 |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |
| MAC Domain 1 Upstream                             |   |   |   |   | 0 | 1 | 2 | 3 |   |   |    |    |    |    |    |    |    |    |    |    |
| MAC Domain 2 Upstream                             |   |   |   |   |   |   |   |   | 0 | 1 | 2  | 3  |    |    |    |    |    |    |    |    |
| MAC Domain 3 Upstream                             |   |   |   |   |   |   |   |   |   |   |    |    | 0  | 1  | 2  | 3  |    |    |    |    |
| MAC Domain 4 Upstream                             |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 0  | 1  | 2  | 3  |

**Table 21** Default Upstream Port Assignments for the Cisco uBR-MC3GX60V Cable Interface Line Card

| Physical Ports (upstream, as labeled on the card) |     |     |     |   |     |     |     |   |     |     |     |     |     |     |    |     |     |    |     |    |
|---------------------------------------------------|-----|-----|-----|---|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|----|-----|-----|----|-----|----|
| Physical Upstream Ports                           | 0   | 1   | 2   | 3 | 4   | 5   | 6   | 7 | 8   | 9   | 10  | 11  | 12  | 13  | 14 | 15  | 16  | 17 | 18  | 19 |
| MAC Domain 0 Upstream                             | 0-3 |     |     |   |     |     |     |   |     |     |     |     |     |     |    |     |     |    |     |    |
| MAC Domain 1 Upstream                             |     | 0-3 |     |   |     |     |     |   |     |     |     |     |     |     |    |     |     |    |     |    |
| MAC Domain 2 Upstream                             |     |     | 0-3 |   |     |     |     |   |     |     |     |     |     |     |    |     |     |    |     |    |
| MAC Domain 3 Upstream                             |     |     |     |   | 0-3 |     |     |   |     |     |     |     |     |     |    |     |     |    |     |    |
| MAC Domain 4 Upstream                             |     |     |     |   |     | 0-3 |     |   |     |     |     |     |     |     |    |     |     |    |     |    |
| MAC Domain 5 Upstream                             |     |     |     |   |     |     | 0-3 |   |     |     |     |     |     |     |    |     |     |    |     |    |
| MAC Domain 6 Upstream                             |     |     |     |   |     |     |     |   | 0-3 |     |     |     |     |     |    |     |     |    |     |    |
| MAC Domain 7 Upstream                             |     |     |     |   |     |     |     |   |     | 0-3 |     |     |     |     |    |     |     |    |     |    |
| MAC Domain 8 Upstream                             |     |     |     |   |     |     |     |   |     |     | 0-3 |     |     |     |    |     |     |    |     |    |
| MAC Domain 9 Upstream                             |     |     |     |   |     |     |     |   |     |     |     | 0-3 |     |     |    |     |     |    |     |    |
| MAC Domain 10 Upstream                            |     |     |     |   |     |     |     |   |     |     |     |     | 0-3 |     |    |     |     |    |     |    |
| MAC Domain 11 Upstream                            |     |     |     |   |     |     |     |   |     |     |     |     |     | 0-3 |    |     |     |    |     |    |
| MAC Domain 12 Upstream                            |     |     |     |   |     |     |     |   |     |     |     |     |     |     |    | 0-3 |     |    |     |    |
| MAC Domain 13 Upstream                            |     |     |     |   |     |     |     |   |     |     |     |     |     |     |    |     | 0-3 |    |     |    |
| MAC Domain 14 Upstream                            |     |     |     |   |     |     |     |   |     |     |     |     |     |     |    |     |     |    | 0-3 |    |

Each MAC domain can have up to 8 upstream ports. Each upstream port can be mapped to a physical port.

### Examples

The following example shows how to configure a MAC domain with 8 upstream ports:

```
Router# configure terminal
Router(config)# interface cable 8/1/0
Router(config-if)# cable upstream max-ports 8
Router(config-if)# cable upstream 0 connector 16
Router(config-if)# cable upstream 1 connector 17
Router(config-if)# cable upstream 2 connector 18
Router(config-if)# cable upstream 3 connector 12
Router(config-if)# cable upstream 4 connector 13
Router(config-if)# cable upstream 5 connector 14
Router(config-if)# cable upstream 6 connector 15
Router(config-if)# cable upstream 7 connector 11
Router(config-if)# exit
Router(config)# exit
Router#
```



#### Note

The "WARNING: This upstream will be removed from all the upstream channel bonding groups in the MAC Domain." warning message is displayed when you configure **no cable upstream connector** command.



#### Note

When an upstream is mapped to a physical upstream port (connector), it is also mapped to an internal upstream PHY receiver. In Cisco uBR-MC5X20U/H, Cisco uBR-MC20X20V, and Cisco uBR-MC88V cable line cards, each upstream PHY chip has two connectors and two receivers, and can support two upstreams. The two upstreams can be mapped in four ways:

- Straight mapping:  
upstream1 =>connector1 =>receiver1;  
upstream2 =>connector2 =>receiver2;
- Share A mapping:  
upstream1 =>connector1 =>receiver1;  
upstream2 =>connector1 =>receiver2;
- Share B mapping:  
upstream1 =>connector2 =>receiver1;  
upstream2 =>connector2 =>receiver2;
- Crossed mapping:  
upstream1 =>connector2 =>receiver1;  
upstream2 =>connector1 =>receiver2;

The card hardware only supports the first three mappings, and does not support crossed mapping. During normal configuration, certain configuration sequence can cause crossed mapping. When that happens, the connector command will fail, and the CNNR-NOXC error message is displayed. To fix the cross mapping, remove all existing upstream connector configurations in these two connectors, and re-provision them.

### Related Commands

| Command                         | Description                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>cable upstream max-ports</b> | Configures the maximum number of upstreams on a downstream (MAC domain) on a Cisco uBR-MC5X20S cable interface line card. |

# cable upstream data-backoff

To specify automatic or fixed start and stop values for data backoff, use the **cable upstream data-backoff** command in cable interface configuration mode. To use the default data backoff values, use the **no** form of this command.

**cable upstream *n* data-backoff { automatic | *start end* }**

**no cable upstream *n* data-backoff**

## Syntax Description

|                  |                                                                                                                                 |
|------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>         | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.     |
| <b>automatic</b> | Specifies automatic data backoff start and stop values. It enables dynamic variation in the <i>start</i> and <i>end</i> values. |
| <i>start</i>     | Binary exponential algorithm. Sets the start value for data backoff. Valid values are from 0 to 15. The default value is 3.     |
| <i>end</i>       | Binary exponential algorithm. Sets the end value for data backoff. Valid values are from 0 to 15. The default value is 5.       |

## Command Default

The default cable upstream data-backoff values are 3 5.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release    | Modification                                           |
|------------|--------------------------------------------------------|
| 12.1 T     | This command was introduced.                           |
| 12.1(5)EC1 | Support was added for the Cisco uBR7100 series router. |
| 12.2(4)BC1 | Support was added for the Cisco uBR10012 router.       |

## Usage Guidelines

The DOCSIS-specified method of contention resolution for CMs used to send data or requests on the upstream channel is a truncated binary exponential backoff with the initial backoff window and the maximum backoff window controlled by the CMTS. The Cisco CMTS router specifies backoff window values for both data and initial ranging, and sends these values downstream as part of the Bandwidth Allocation Map (MAP) MAC message.

The values specified in this command are exponential power-of-two values. For example, a value of 4 indicates a window between 0 and 15; a value of 10 indicates a window between 0 and 1023.

Cisco recommends that you use the automatic settings for data backoff. If you decide to manually specify the data-backoff values, use the following formula as a guideline for the *start* and *end* binary exponents:

$$0.33 = (2^{**stop} - 2^{**start}) / n$$

where *n* is the number of CMs on the upstream. Choose *start* and *stop* values that come closest to the value of 0.33 (which is the optimal probability to transmit on a contention-based system).



## Examples

The following example shows how to set the automatic data backoff values for upstream 2 on a cable interface card:

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 2 data-backoff automatic
Router(config-if)#
```

## Related Commands

| Command                             | Description                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------|
| <b>cable insertion-interval</b>     | Configures the interval between consecutive initial ranging slots on an upstream. |
| <b>cable upstream range-backoff</b> | Specifies automatic or configured initial ranging backoff calculation.            |
| <b>show controllers cable</b>       | Displays the backoff window setting for the configured upstream port.             |

# cable upstream description

To assign a label to an upstream, use the **cable upstream description** command in cable interface configuration mode. To remove the label from the upstream, use the **no** form of this command.

**cable upstream *n* description *label***

**no cable upstream *n* description**

## Syntax Description

|              |                                                                                                                                                                                        |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>     | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                            |
| <i>label</i> | An arbitrary string, up to 80 characters long, that describes this upstream for management and tracking purposes. If the string contains any spaces, enclose the string within quotes. |

## Command Default

No description is assigned to upstreams

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release | Modification                 |
|---------|------------------------------|
| 11.3 NA | This command was introduced. |

## Usage Guidelines

Use the **cable upstream description** command to assign arbitrary labels to the upstreams on the cable interfaces. These labels can contain any information that identifies the upstream and that could aid in network management or troubleshooting.



### Tip

Use the **show interface cable upstream** command to display the labels that are assigned to a particular upstream.

## Examples

The following example shows how to assign descriptions to the first two upstreams on the cable interface in slot 3:

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 0 description "SJ-Node1-Upstream 0"
Router(config-if)# cable upstream 1 description "SJ-Node1-Upstream 1 (Unused)"
Router(config-if)#
```

## Related Commands

| Command                     | Description                                                         |
|-----------------------------|---------------------------------------------------------------------|
| <b>show interface cable</b> | Displays the current configuration and status of a cable interface. |

# cable upstream differential-encoding

To enable differential encoding on upstream traffic to a specified cable interface, use the **cable upstream differential-encoding** command in cable interface configuration mode. To disable this function, use the **no** form of this command.

**cable upstream *n* differential-encoding**

**no cable upstream *n* differential-encoding**

|                           |          |                                                                                                                             |
|---------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i> | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card. |
|---------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------|

|                        |         |
|------------------------|---------|
| <b>Command Default</b> | Enabled |
|------------------------|---------|

|                      |                                                |
|----------------------|------------------------------------------------|
| <b>Command Modes</b> | Interface configuration (cable interface only) |
|----------------------|------------------------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.1           | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>To verify whether or not upstream differential encoding is activated, enter the <b>show running-config</b> command and look for the cable interface configuration information. If upstream differential encoding is enabled, a differential encoding entry is displayed in the output of the <b>show running-config</b> command. If upstream differential encoding is disabled, no differential encoding entry is displayed in the output.</p> |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

If you are having trouble, make sure that the cable connections are not loose or disconnected; the cable interface line card is firmly seated in its chassis slot; the captive installation screws are tight; you have entered the correct slot and port numbers; and you selected a valid frequency for your router.

|                 |                                                                                      |
|-----------------|--------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable differential encoding for upstream port 2: |
|-----------------|--------------------------------------------------------------------------------------|

```
Router(config-if)# cable upstream 2 differential-encoding
Router(config-if)#
```

# cable upstream docsis-mode

To configure an upstream to use DOCSIS 1.x, DOCSIS 2.0 or DOCSIS 3.0 modulation profiles, use the **cable upstream docsis-mode** command in cable interface configuration mode. To reset the upstream to its default configuration, use the **no** form of this command.

**cable upstream *n* docsis-mode {atdma | scdma | scdma-d3 | tdma | tdma-atdma}**

**no cable upstream *n* docsis-mode {atdma | scdma | scdma-d3 | tdma | tdma-atdma}**

## Syntax Description

|                   |                                                                                                                                                                                                                                                                    |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>          | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                               |
| <b>atdma</b>      | Configures the upstream only for DOCSIS 2.0 Advanced Time Division Multiple Access (A-TDMA) modulation profiles.                                                                                                                                                   |
| <b>scdma</b>      | Configures the upstream for DOCSIS 2.0 Synchronous Code Division Multiple Access (S-CDMA) modulation profiles only.                                                                                                                                                |
| <b>scdma-d3</b>   | Configures the upstream for DOCSIS 3.0 S-CDMA modulation profiles. The <b>scdma-d3</b> option uses channel type 4SR mode.                                                                                                                                          |
| <b>tdma</b>       | Configures the upstream only for DOCSIS 1.0/DOCSIS 1.1 Time Division Multiple Access (TDMA) modulation profiles (default).                                                                                                                                         |
| <b>tdma-atdma</b> | Configures the upstream for both A-TDMA and TDMA operations (mixed mode). If you are using abbreviations at the command line, you must specify at least the <b>tdma</b> to select the mixed mode. If you choose a shorter abbreviation, you select TDMA-only mode. |

## Command Default

All upstreams are configured ATDMA-only mode.

## Command Modes

Interface configuration (config-if)

## Command History

| Release      | Modification                                                                                                                                                                                             |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)CX   | This command was introduced to support DOCSIS 2.0 A-TDMA and mixed modulation profiles on the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line card on the Cisco uBR7246VXR router.          |
| 12.2(15)BC2  | Support was added for the Cisco uBR-MC5X20S/U cable interface line cards on the Cisco uBR10012 router.                                                                                                   |
| 12.3BC       | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                               |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                                          |
| 12.2(33)SCC  | This command was modified with the addition of <b>scdma</b> and <b>scdma-d3</b> keyword options and support was added for the Cisco UBR-MC20X20V cable interface line card on the Cisco uBR10012 router. |
| 12.2(33)SCG  | The command default was changed from TDMA to ATDMA.                                                                                                                                                      |
| 12.2(33)SCG2 | Support was added for the Copy and Paste Support for TDMA to A-TDMA upgrade feature.                                                                                                                     |

**Usage Guidelines**

The DOCSIS 2.0 specification builds on the existing TDMA to support advanced modulation profiles that increase potential upstream bandwidth. The A-TDMA profiles support higher QAM rates of up to 64-QAM and wider channel widths of up to 6.4 MHz (5.12 Msymbols).

**Note**

The advanced hardware-based spectrum management features for the Cisco uBR-MC16S/U/X, Cisco uBR-MC28U/X, and Cisco uBR-MC5X20S/U cards are supported only in the DOCSIS 1.0/1.1 TDMA-only mode. They cannot be used in the mixed or A-TDMA-only modes.

**Note**

Starting with Cisco IOS Release 12.2(33)SCG and later, the default upstream DOCSIS mode is ATDMA only.

The DOCSIS 2.0 specification allows an upstream to be configured in one of the following three modes:

- A-TDMA only mode—Upstreams only support cable modems that register using A-TDMA modulation profiles. The CMTS does not allow DOCSIS 1.0 and DOCSIS 1.1 cable modems to register and come online on these upstreams. The Cisco uBR-MC5X20S/U, Cisco uBR-MC16U/X, and Cisco uBR-MC28U/X cards also support 6,400,000 Hz (5,120,000 symbols/sec) when operating in DOCSIS 2.0 (A-TDMA-only) mode.

Changing the DOCSIS mode to A-TDMA only mode automatically changes the symbol rate to 5.12 megasymbols per second and the channel width to 6.4 MHz. It also automatically disables the dynamic upstream modulation.

**Note**

Starting with Cisco IOS 12.2(33)SCG2, when the channel-width value in the **cable upstream channel-width** command is specified as 6.4 MHz in the TDMA or mixed TDMA/A-TDMA mode, the DOCSIS mode automatically changes to A-TDMA-only (DOCSIS 2.0) mode.

Changing DOCSIS mode to A-TDMA only mode will not automatically change the symbol rate to 5.12 megasymbols per second and the channel width to 6.4 MHz. The symbol rate and channel width before the DOCSIS mode change are maintained after the change.

In addition, the following are required to support the DOCSIS 2.0 A-TDMA features:

- Cable modems must be DOCSIS 2.0 compliant.
- The DOCSIS configuration file for the cable modem must either omit the DOCSIS 2.0 Enable field (TLV 39), or it must set TLV 39 to 1 (enable). If you set TLV 39 to 0 (disable), a DOCSIS 2.0 CM uses the TDMA mode.
- The upstream must be configured for either A-TDMA-only or mixed TDMA/A-TDMA mode.
- TDMA-only mode—Upstreams only support cable modems that register using TDMA modulation profiles. DOCSIS 2.0 cable modems can register on these upstreams only by using a DOCSIS 1.0/DOCSIS 1.1 modulation profile (which typically would happen only when a DOCSIS 2.0 cable modem cannot find an A-TDMA channel in its DOCSIS domain).

Changing the DOCSIS mode to TDMA-only mode automatically changes the symbol rate to 1.28 megasymbols per second and the channel width to 3.2 MHz. It also automatically disables the dynamic upstream modulation.

- Mixed mode—Upstreams support both DOCSIS 1.0/DOCSIS 1.1 cable modems using TDMA modulation profiles and DOCSIS 2.0 cable modems using A-TDMA modulation profiles. (The maximum channel width in mixed mode is 3.2 MHz.)

Changing the DOCSIS mode to mixed mode also automatically changes the symbol rate to 1.28 megasymbols per second and the channel width to 3.2 MHz. Dynamic upstream modulation is also automatically disabled.



---

**Note** Mixed mode upstreams do not support the 6.4 MHz channel width.

---

The DOCSIS 3.0 specification allows an upstream to be configured in one of the following modes:

- SCDMA-d3 mode—Upstreams only support cable modems that register using DOCSIS 3.0 S-CDMA modulation profiles.
- SCDMA mode—Upstreams only support cable modems that register using DOCSIS 2.0 S-CDMA modulation profiles.



**Note**

---

The DOCSIS 3.0 option **scdma-d3** (4SR) is available only when the CMTS is configured to operate in the global modulation profile format and is not available in the default mode. This option is available only for the Cisco UBR-MC20X20V cable interface line card, and not for other legacy line cards.

---

Refer to the **cable upstream channel-width** command for valid values of supported channel widths and DOCSIS modes for cable interfaces.



**Note**

---

Changing the DOCSIS Mode for an Upstream Port Forces the Cable Modems on That Upstream to Go Offline and Reregister

---

When you switch the DOCSIS mode of an upstream between the TDMA-only and mixed TDMA/A-TDMA modes, cable modems that are currently online on that upstream are taken offline and are forced to reregister. This helps the CMTS to determine the capabilities of the cable modems on the new channels.

If you change an upstream port to A-TDMA only mode, DOCSIS 1.x cable modems will not be able to come online on that upstream. If you change an upstream to TDMA only mode, DOCSIS 2.0-compliant cable modems are expected to attempt to come online on another upstream that is configured for A-TDMA or mixed mode. If no such upstreams are configured, or if the cable modem is configured to use only that particular upstream, it comes online in the DOCSIS 1.x mode.



**Note**

---

DOCSIS 2.0-compliant cable modems that are already online on a TDMA-only upstream do not automatically reregister on another upstream that has been configured for mixed-mode operations. The cable modem must either be reset or the CMTS must send an Upstream Channel Change (UCC) message to instruct the cable modem to move to the new channel.

---

If you change an upstream port to the mixed TDMA/A-TDMA mode, and some cable modems remain offline, or appear to come online but cannot pass traffic, upgrade the modem software to a DOCSIS-compliant software version.



**Note**

---

The cable physical plant must support the higher upstream bandwidths and symbol rates to be able to use the A-TDMA or mixed mode modulation profiles.

---

**Examples**

The following example configures the first four upstreams for the first downstream on the Cisco uBR-MC28U/X cable interface line card in slot 5/0. The first two upstreams are configured for A-TDMA mode and the last two upstreams are configured for mixed TDMA/A-TDMA mode.

```
Router# config terminal
Router(config)# interface cable 5/0/0
Router(config-if)# cable upstream 0 docsis-mode atdma
%%Docsis mode set to ATDMA only, 1.x CMs will go offline.
%%The following defaults will be set:
%%Channel Width 6.4MHz
%%Minislot Size 1 tick
%%Modulation Profile 241

Router(config-if)# cable upstream 1 docsis-mode atdma
%%Docsis mode set to ATDMA only, 1.x CMs will go offline.
%%The following defaults will be set:
%%Channel Width 6.4MHz
%%Minislot Size 1 tick
%%Modulation Profile 241

Router(config-if)# cable upstream 2 docsis-mode tdma-atdma
%%Docsis mode set to DOCSIS2.0 Mixed Mode.

Router(config-if)# cable upstream 3 docsis-mode tdma-atdma
%%Docsis mode set to DOCSIS2.0 Mixed Mode.

Router(config-if)# exit
Router(config)# exit
Router#
```

The following example shows the abbreviations needed to configure TDMA-only and mixed TDMA/A-TDMA modes.

```
Router# config terminal
Router(config)# interface cable 4/0

Router(config-if)# cable upstream 0 docsis-mode tdm
%%Docsis mode set to DOCSIS1.0 TDMA Mode.

Router(config-if)# cable upstream 1 docsis-mode tdma-
%%Docsis mode set to DOCSIS2.0 Mixed Mode.

Router(config-if)#
```

The following examples configures the SCDMA and SCDMA-d3 modes.

```
Router# config terminal
Router(config-if)# cable upstream 0 docsis-mode scdma
%interface Cable7/1/0 U0 Docsis mode set to DOCSIS2.0 SCDMA
%modulation profile set to 321
Router(config-if)#

Router# config terminal
Router(config-if)# cable upstream 0 docsis-mode scdma-d3
%interface Cable7/1/0 U0 Docsis mode set to DOCSIS3.0 SCDMA (1.x and 2.0 CMs wi)
%modulation profile set to 381
Router(config-if)#
SLOT 7/1: Jul 10 22:04:24.356: %UBR10000-6-PREAMLENADJUST: initial burst's prea.
SLOT 7/1: Jul 10 22:04:24.356: %UBR10000-6-PREAMLENADJUST: station burst's prea.
Router(config-if)# end
```

**Related Commands**

| Command                                        | Description                                                                                                                      |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>                | Defines a modulation profile for use on the router.                                                                              |
| <b>cable modulation-profile global-scheme</b>  | Defines a global modulation profile for use on the router.                                                                       |
| <b>cable upstream channel-width</b>            | Specifies an upstream channel width for an upstream port.                                                                        |
| <b>cable upstream equalization-coefficient</b> | Enables the use of a DOCSIS 1.1 pre-equalization coefficient on an upstream.                                                     |
| <b>cable upstream maintain-psd</b>             | Requires DOCSIS 2.0 CMs on an A-TDMA-only upstream to maintain a constant power spectral density after a modulation rate change. |
| <b>cable upstream modulation-profile</b>       | Assigns one or two modulation profiles to an upstream port.                                                                      |
| <b>show cable modulation-profile</b>           | Displays the modulation profile information for a Cisco CMTS.                                                                    |
| <b>show interface cable mac-scheduler</b>      | Displays the current time-slot scheduling state and statistics.                                                                  |



# cable upstream dpon

To enable the DOCSIS Passive Optical Network (DPON) for a MAC domain on the Cisco CMTS router, use the **cable upstream dpon** command in interface configuration mode. To disable one or more DPONs for the MAC domains, use the **no** form of this command.

**cable upstream dpon**

**no cable upstream dpon**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                        |                       |
|------------------------|-----------------------|
| <b>Command Default</b> | D-PON is not enabled. |
|------------------------|-----------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCE    | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>Configuring D-PON for a MAC domain enables D-PON for all MAC domains on that line card. However, only a single MAC domain can be used within a D-PON fiber node. This is to ensure proper scheduling of the upstream and to prevent multiple Optical Network Terminals (ONTs) from transmitting upstream data at the same time.</p> |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

You should configure the **cable upstream ranging-init-technique 2** command to prevent the use of additional broadcast initial ranging opportunities for the non-DPON reference upstream channels.

When you shutdown an upstream channel, the D-PON associated with that MAC domain will stop working. To enable D-PON again, you must manually shut down and enable the MAC domain using the **shutdown** and **no shutdown** command.

|                 |                                                                         |
|-----------------|-------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable D-PON on a Cisco CMTS router: |
|-----------------|-------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# interface cable 7/0/1
Router(config-if)# cable upstream dpon
Router(config-if)# shutdown
Router(config-if)# no shutdown
```

| Related Commands | Command                                      | Description                                                             |
|------------------|----------------------------------------------|-------------------------------------------------------------------------|
|                  | <b>cable upstream ranging-init-technique</b> | Configures the initial ranging technique for the modem in the MTC-mode. |
|                  | <b>interface cable</b>                       | Specifies a cable interface.                                            |
|                  | <b>show interface cable mac-scheduler</b>    | Displays the current time-slot scheduling state and statistics.         |

# cable upstream equalization-coefficient

To enable the use of a DOCSIS 1.1 or 2.0 pre-equalization coefficient on an upstream port, use the **cable upstream equalization-coefficient** command in cable interface configuration mode. To disable the use of the pre-equalization coefficient, use the **no** form of this command.

**cable upstream *n* equalization-coefficient**

**no cable upstream *n* equalization-coefficient**

## Syntax Description

|          |                                                                                                                     |
|----------|---------------------------------------------------------------------------------------------------------------------|
| <i>n</i> | Specifies the upstream port number. Valid range is from 0 to 7 for upstream ports in the cable interface line card. |
|----------|---------------------------------------------------------------------------------------------------------------------|

## Command Default

Pre-equalization coefficient is disabled.

## Command Modes

Interface configuration (cconfig-if)

## Command History

| Release     | Modification                                                                                                                                            |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(4)BC1  | This command was introduced.                                                                                                                            |
| 12.2(15)CX  | Support was added for the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line card, including DOCSIS 2.0 A-TDMA and mixed modulation profiles. |
| 12.2(15)BC2 | Support was added for DOCSIS 2.0 A-TDMA and mixed modulation profiles on the Cisco uBR-MC5X20S/U cable interface line cards.                            |
| 12.3(23)BC6 | Support was added for updated default modulation profiles for use with pre-equalization on the Cisco uBR-MC5X20S/U/H cable interface line cards.        |
| 12.2(33)SCB | Support was added for updated default modulation profiles for use with pre-equalization on the Cisco uBR-MC5X20S/U/H cable interface line cards.        |

## Usage Guidelines

The DOCSIS 1.1 and 2.0 specifications allow a CMTS to specify a pre-equalization coefficient in the DOCSIS ranging response (RNG-RSP) MAC management messages it forwards to the cable modems (CM)s. When this is enabled, a CM can engage in transmit-side equalization (pre-equalization) to mitigate the effects of certain impairments in the cable plant, such as in-channel tilt, and group delay.

These impairments are more significant with higher order modulation formats such as 64-QAM or 16-QAM, and near the first octave break-point of the diplex filters (34 MHz to 38 MHz). This break-point exists predominantly as a time-domain group delay issue, and becomes severe for longer amplifier cascades.

Each amplifier causes the DOCSIS upstream signal to traverse two diplex filters. All diplex filter frequency splits (5-42 MHz, 5-65 MHz, or 5-88 MHz) share this characteristic, which is not visible in a frequency response measurement or sweep test.

**Note**

For more information about the use of pre-equalization, see the DOCSIS 2.0 RFI specification section 6.2.15, Transmit Pre-Equalizer, and section 8.3.6 Ranging Response (RNG-RSP) MAC Management Messages.

DOCSIS 1.1 specifies the Type 4 type length value (TLV), and an 8-tap equalizer. DOCSIS 2.0 adds the Type 9 TLV, and increases the equalizer to support 24 taps to compensate for more complex impairments.

The **cable upstream equalization-coefficient** command configures the CMTS to send Type 4 TLV or Type 9 TLVs in the DOCSIS RNG-RSP MAC management messages to the CMs.

The **no** form of the command disables the CMTS from sending Type 4 TLV or Type 9 TLVs in the DOCSIS RNG-RSP MAC management messages to the CMs.

After the CMTS stops sending pre-equalization TLVs to the CM, the CM must retain these values until the modem's cable interface resets, or a modification is made to the upstream channel descriptor (UCD), which would make the stored equalization coefficients invalid.

**Tip**

You can reset the cable modem's interface by:

- Power cycling the cable modem
- Resetting the cable modem from the CMTS using the **clear cable modem** command

```
Router# clear cable modem aaaa.bbbb.cccc reset
```

You can reset the equalizer coefficient of all CMs on an upstream by:

- Changing the upstream center frequency. A 16-kHz or 32-kHz change is sufficient and unlikely to take many CMs offline.
- Briefly changing the periodic ranging messages in the modulation profile between 16-QAM and Quadrature Phase Shift Keying (QPSK), or 64-QAM and 16-QAM.

A CMTS operating in a pure DOCSIS 2.0 upstream mode sends equalizer data supporting 24 taps to all modems during initial ranging.

The **cable up 0 docsis-mode atdma** command configures a DOCSIS 2.0-only upstream mode on the CMTS.

A CMTS operating in a DOCSIS 1.1 or mixed TDMA-ATDMA upstream mode sends equalizer data supporting 8 taps to all modems during initial ranging. The CMTS cannot send data supporting 24 taps until it is notified by the CM, that it is DOCSIS 2.0 compliant in the Registration Request (REG-REQ) message, immediately preceding the online state.

This can be configured on the CMTS using the **cable up 0 docsis-mode tdma-atdma** command.

When a CM receives a Type 4 TLV in the RNG-RSP MAC management message from the CMTS, it must combine the previously stored values with the new values from the CMTS. Under certain HFC plant conditions, a dynamic impairment occurs that require the CM to adjust its main equalizer tap. The DOCSIS standard specifies a convolution function that is sometimes unable to adjust for dynamic impairments. The result, is a CM whose signal-to-noise ratio (SNR) value as received by the CMTS, is quite low compared to other CMs on the same upstream.

In a mixed modulation profile, where station maintenance is of a lower order modulation format than the data grants, it is possible for the modem to enter a steady state where the SNR estimate is:

- Below the required estimate for data grants to be processed by the CMTS
- Above the requirement for station maintenance

This results in a modem that responds to DOCSIS Layer 2 pings, but not to Layer 3 traffic. The following commands can be used to check status:

- **ping docsis** {*cm-mac address* | *cm ip address*}—succeeds
- **ping ip** {*cm IP address* | *CPE IP address*}—fails

A cable modem whose SNR estimate is in this condition may enter the expired(pt) state when baseline privacy interface plus (BPI+) is enabled. A modulation profile where station maintenance and data grants are of the same order modulation, prevents this condition.

The CMTS may be configured to enable cable upstream pre-equalization on a per upstream port basis, and may be configured to disable the sending of upstream equalization-coefficients on a per modem MAC address or Organizational Unique Identifier (OUI) basis, using the related global exclude commands.



#### Note

Some DOCSIS 2.0 compliant CMs / embedded media terminal adapters (EMTA)s have been known to report as DOCSIS 1.1 compliant to the CMTS, unless connected to a DOCSIS 2.0 format upstream. These CMs are treated by the CMTS as DOCSIS 1.1, and only send 8-tap equalizer coefficients. A firmware or SNMP set may be used on these cable modems to enable the proper reporting of DOCSIS 2.0 compliance under a DOCSIS 1.1-style upstream (for example, 3.2 MHz, 16-QAM, TDMA format).

Some older DOCSIS cable modem firmware versions will incorrectly process the transition from 8 to 24 taps when in a mixed TDMA-ATDMA mode, and will experience degrading or low SNR MER as displayed with **show cable modem phy** command. Upgrade the CM firmware, and temporarily move these modems to a pure DOCSIS 1.1 or 2.0 channel or disable pre-equalization for these devices with the exclude command.

#### Examples

The example shows how to enable the use of the pre-equalization coefficient on upstream port 0 in the cable interface line card in slot 5/1 on the Cisco uBR10012 router, while excluding the equalization coefficient messaging to a modem with MAC address aaaa.bbbb.cccc, and all modems with the OUI of 00aa.bb:

```
Router# configure terminal
Router# cable pre-equalization exclude aaaa.bbbb.cccc
Router# cable pre-equalization exclude 00aa.bb
Router(config)# interface cable 5/1/0
Router(config-if)# cable upstream 0 equalization-coefficient
Router(config-if)#
```

#### Related Commands

| Command                                | Description                                                                                   |
|----------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>show cable modem phy</b>            | Displays the physical layer RF parameters of the cable modem, including USSNR estimate (MER). |
| <b>show cable modem docsis version</b> | Displays the DOCSIS version of a cable modem, and the upstream DOCSIS mode— TDMA or ATDMA.    |

| Command                                                                                             | Description                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>show cable modem</b> [verbose]                                                                   | Displays detailed information about the cable modem. Lines with the string Equalizer describe modem specific equalizer data.                                                                                |
| <b>debug cable range</b>                                                                            | Debugging commands to display the equalizer coefficients being sent by the CMTS to the cable modem in the DOCSIS RNG-RSP MAC management messages.                                                           |
| <b>debug cable interface</b> {interface}<br>{cm-mac-address}[verbose]                               | Debugging commands to display the equalizer coefficients being sent by the CMTS to the cable modem in the DOCSIS RNG-RSP MAC management messages.                                                           |
| <br><b>Caution</b> | Certain debug settings can produce a very large amount of data on a production router, and should be used with caution. Specifying the CM mac-address will dramatically reduce the amount of data produced. |

# cable upstream equalization-error-recovery

To enable the pre-equalizer direct load mechanism on an upstream port, use the **cable upstream equalization-error-recovery** command in cable interface configuration mode.

**cable upstream** *port number* **equalization-error-recovery**

**no cable upstream** *port number* **equalization-error-recovery**

## Syntax Description

|                    |                                                                                |
|--------------------|--------------------------------------------------------------------------------|
| <i>port number</i> | Specifies an upstream port number on a cable interface. Valid range is 0 to 7. |
|--------------------|--------------------------------------------------------------------------------|

## Command Default

This command is enabled by default.

## Command Modes

Interface configuration (config-if)

## Command History

| Release      | Modification                                                     |
|--------------|------------------------------------------------------------------|
| 12.3(23)BC7  | This command was introduced.                                     |
| 12.2(33)SCB4 | This command was integrated into Cisco IOS Release 12.2(33)SCB4. |

## Usage Guidelines

The pre-equalizer direct load mechanism is enabled by default. However, to use this direct load mechanism, you must enable the pre-equalization coefficient on an upstream port using the **cable upstream equalization-coefficient** command.

The **cable upstream equalization-error-recovery** command enables the CMTS to send Type-Length-Value (TLV) Type 9 in the DOCSIS RNG-RSP MAC management messages. This mechanism helps CMs come online when TLV Type 4 convolved method causes CMs to go offline.



### Note

The TLV Type 9, called pre-equalizer direct load, supports only the DOCSIS 2.0 or 3.0-certified modems. When a CM receives TLV Type 9, the CM replaces its data with the new data provided in the DOCSIS RNG-RSP MAC management messages.

## Examples

The example shows how to enable the pre-equalizer direct load mechanism on a cable interface line card in slot 8/0 on the Cisco uBR10012 router.

```
Router# configure terminal
Router(config)# interface cable 8/0/0
Router(config-if)# cable upstream 0 equalization-error-recovery
```

| Related Commands | Command                                        | Description                                                                                                       |
|------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                  | <b>show cable modem</b>                        | Displays information for the registered and unregistered CMs.                                                     |
|                  | <b>cable upstream equalization-coefficient</b> | Enables the use of a DOCSIS 1.1 or 2.0 pre-equalization coefficient on an upstream port.                          |
|                  | <b>show cable modem calls</b>                  | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |



# cable upstream ext-power

To enable the DOCSIS extended transmit power support on the Cisco CMTS, use the **cable upstream ext-power** command in interface configuration mode. To disable DOCSIS extended transmit power support, use the **no** form of this command.

**cable upstream ext-power**

**no cable upstream ext-power**

**Syntax Description** This command has no arguments or keywords.

**Command Default** DOCSIS extended transmit power support is enabled.

**Command Modes** Interface configuration (config-if)

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCF2 | This command was introduced. |

**Examples** The following example shows how to enable DOCSIS extended transmit power support on the Cisco CMTS:

```
Router# configure terminal
Router(config)# interface cable 7/0/0
Router(config-if)# cable upstream ext-power
Router(config-if)# end
```

**Associated Features** The **cable upstream ext-power** command is used to configure the following feature:

- [Upstream Channel Bonding](#)

| Command                                | Description                                                                         |
|----------------------------------------|-------------------------------------------------------------------------------------|
| <b>show cable modem extended-power</b> | Displays the list of cable modems that are transmitting at an extended power level. |

# cable upstream fec

To enable upstream forward error correction (FEC), use the **cable upstream fec** command in cable interface configuration mode. To disable FEC, use the **no** form of this command.

- cable upstream *n* fec**
- no cable upstream *n* fec**

|                    |          |                                                                                                                             |
|--------------------|----------|-----------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i> | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card. |
|--------------------|----------|-----------------------------------------------------------------------------------------------------------------------------|

|                 |         |
|-----------------|---------|
| Command Default | Enabled |
|-----------------|---------|

|               |                                                |
|---------------|------------------------------------------------|
| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|

| Command History | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>11.3 XA</td><td>This command was introduced.</td></tr></table> | Release | Modification | 11.3 XA | This command was introduced. |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------|---------|--------------|---------|------------------------------|
| Release         | Modification                                                                                                                |         |              |         |                              |
| 11.3 XA         | This command was introduced.                                                                                                |         |              |         |                              |

|                  |                                                                                                                                                                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The Cisco CMTS uses FEC to attempt to correct any upstream data that might have been corrupted. To use this feature, you need to activate FEC on the upstream RF carrier. When FEC is activated, the Cisco CMTS commands all CMs on the network to activate FEC. |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                           |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to activate upstream forward error correction:</p> <pre>Router (config-if)# cable upstream 0 fec</pre> |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands                  | <table><tr><th>Command</th><th>Description</th></tr><tr><td><b>cable upstream frequency</b></td><td>Enters a fixed frequency of the upstream RF carrier for an upstream port.</td></tr><tr><td><b>cable upstream power-level</b></td><td>Sets the input power level for the upstream RF carrier in decibels per millivolt (dBmV).</td></tr><tr><td><b>cable upstream scrambler</b></td><td>Enables the cable upstream scrambler.</td></tr><tr><td><b>cable upstream shutdown</b></td><td>Disables the upstream port.</td></tr></table> | Command | Description | <b>cable upstream frequency</b> | Enters a fixed frequency of the upstream RF carrier for an upstream port. | <b>cable upstream power-level</b> | Sets the input power level for the upstream RF carrier in decibels per millivolt (dBmV). | <b>cable upstream scrambler</b> | Enables the cable upstream scrambler. | <b>cable upstream shutdown</b> | Disables the upstream port. |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|---------------------------------|---------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------|--------------------------------|-----------------------------|
| Command                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |             |                                 |                                                                           |                                   |                                                                                          |                                 |                                       |                                |                             |
| <b>cable upstream frequency</b>   | Enters a fixed frequency of the upstream RF carrier for an upstream port.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |             |                                 |                                                                           |                                   |                                                                                          |                                 |                                       |                                |                             |
| <b>cable upstream power-level</b> | Sets the input power level for the upstream RF carrier in decibels per millivolt (dBmV).                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |             |                                 |                                                                           |                                   |                                                                                          |                                 |                                       |                                |                             |
| <b>cable upstream scrambler</b>   | Enables the cable upstream scrambler.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |             |                                 |                                                                           |                                   |                                                                                          |                                 |                                       |                                |                             |
| <b>cable upstream shutdown</b>    | Disables the upstream port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |             |                                 |                                                                           |                                   |                                                                                          |                                 |                                       |                                |                             |

# cable upstream fec-strength

To override the forward error correction (FEC) setting specified in the modulation profile for this upstream channel, use the **cable upstream fec-strength** command in cable interface configuration mode. To restore the default value, use the **no** form of this command.

**cable upstream *n* fec-strength *t-bytes***

**no cable upstream *n* fec-strength**

## Syntax Description

|                |                                                                                                                                                                                                                                                                                   |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>       | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                                       |
| <i>t-bytes</i> | Overrides the FEC strength specified in the modulation profile for this upstream channel. Valid values are from 0 to 10, where: <ul style="list-style-type: none"> <li>0 disables FEC.</li> <li>1 is the lowest FEC strength.</li> <li>10 is the highest FEC strength.</li> </ul> |

## Command Default

No default behavior or values

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release   | Modification                             |
|-----------|------------------------------------------|
| 12.0(4)XI | This command was introduced.             |
| 12.1T     | This command was deprecated and removed. |

## Examples

The following example shows how to configure the **cable upstream fec-strength** command:

```
Router(config-if)# cable upstream 2 fec-strength 3
```

## Related Commands

| Command                                  | Description                                                                                                   |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>cable upstream channel-width</b>      | Specifies an upstream channel width for a headend cable router.                                               |
| <b>cable upstream fec</b>                | Enables the upstream FEC.                                                                                     |
| <b>cable upstream hopping blind</b>      | Disables optimum frequency hopping on the Cisco uBR-MC16S and Cisco uBR-MC5X20S/U cable interface line cards. |
| <b>cable upstream modulation-profile</b> | Overrides modulation types specified in the modulation profile for the specified upstream channel.            |

# cable upstream fragmentation

To enable fragmentation of DOCSIS frames on a particular upstream, use the **cable upstream fragmentation** command in cable interface configuration mode. To disable fragmentation, use the **no** form of this command.

- cable upstream *n* fragmentation**
- no cable upstream *n* fragmentation**

**Syntax Description**

|          |                                                                                                                             |
|----------|-----------------------------------------------------------------------------------------------------------------------------|
| <i>n</i> | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card. |
|----------|-----------------------------------------------------------------------------------------------------------------------------|

**Command Default**

By default, fragmentation is enabled for all upstream ports on ASIC line cards (Cisco uBR-MC11C, Cisco uBR-MC12C, Cisco uBR-MC14C, Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C) and disabled for all upstream ports on old FPGA line cards.

  
**Note**

Cisco IOS Release 12.1 CX supports the Multiple Grant Mode of DOCSIS 1.1 fragmentation.

**Command Modes**

Interface configuration (cable interface only)

**Command History**

| Release    | Modification                                                     |
|------------|------------------------------------------------------------------|
| 12.1(4)CX  | This command was introduced.                                     |
| 12.2(4)BC1 | Support for this command was added to the Release 12.2 BC train. |

**Usage Guidelines**

This command enables and disables DOCSIS layer 2 fragmentation, which reduces run-time jitter experienced by constant bit rate (CBR) slots on the corresponding upstream. Disabling fragmentation increases the run-time jitter, but also reduces the fragmentation reassembly overhead for fragmented MAC frames. For ports running CBR traffic, fragmentation should be enabled (the default).

  
**Note**

Do not confuse DOCSIS Layer 2 fragmentation with IP Layer 3 fragmentation.

**Examples**

The following command shows DOCSIS fragmentation being enabled on upstream 0 on the cable interface in slot 2/0:

```
Router# configure terminal
Router(config)# interface c2/0
Router(config-if)# cable upstream 0 fragmentation
Router(config-if)#
```

| Related Commands | Command                              | Description                                                                                                                       |
|------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable default-phy-burst</b>       | Specifies a value for the upstream Maximum Traffic Burst parameter for CMs that do not specify their own value.                   |
|                  | <b>cable upstream fragment-force</b> | Specifies that a cable interface line card should fragment DOCSIS frames on an upstream when the frame exceeds a particular size. |

# cable upstream fragment-force

To specify that a cable interface line card should fragment DOCSIS frames on an upstream when the frame exceeds a particular size, use the **cable upstream fragment-force** command in cable interface configuration mode. To disable the forcing of fragmentation, use the **no** form of this command.

**cable upstream *n* fragment-force** [*fragment-threshold* [*number-of-fragments*] ]

**no cable upstream *n* fragment-force**

|                    |                            |                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i>                   | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                                                                                                                                                          |
|                    | <i>fragment-threshold</i>  | (Optional) Number of bytes for the threshold at which DOCSIS frames are fragmented. The valid value ranges from 1,500 to 3,500 bytes, with the default value of 2,000 bytes.<br><br>For Cisco uBR10-MC5X20S cable interface line card running Cisco IOS Release 12.3(23)BC1, the valid value ranges from 0 to 1,987 bytes, with the default value of 1,600 bytes.                                    |
|                    | <i>number-of-fragments</i> | (Optional) Number of fragments that the cable interface line card should create when fragmenting DOCSIS frames. The card attempts to create this many equal-sized fragments when fragmenting. The valid value ranges from 1 to 10 fragments, with the default value of 3 fragments.<br><br>The <i>number-of-fragments</i> option has been deprecated. See Usage Guidelines section for more details. |

**Command Default** Fragmentation is enabled.

**Command Modes** Interface configuration (config-if)

| Command History | Release     | Modification                                                                             |
|-----------------|-------------|------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC2 | This command was introduced.                                                             |
|                 | 12.3(21a)BC | This command was modified and the <i>number-of-fragments</i> option has been deprecated. |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB.                          |

**Usage Guidelines** DOCSIS 1.1 allows the CMTS to fragment DOCSIS frames to improve performance, especially in networks that combine real-time traffic, such as voice, with data traffic. The **cable upstream fragment-force** command allows you to specify the size of frames that should be fragmented, as well as the number of fragments that should be created when fragmenting.

**Tip**

This command takes effect only when fragmentation has been enabled on the upstream using the **cable upstream fragmentation** command (which is the default configuration).

In the default configuration, the Cisco CMTS fragments DOCSIS frames that are 2,000 bytes or larger in size, and it fragments these frames into equally-sized fragments. Starting from Cisco IOS Release 12.2(21a)BC, 12.2(33)SCB, and later releases, the larger frames are fragmented by the threshold. Instead of dividing frames into equal number of fragments as before, the concatenated frames are cut into many fragments, as defined in the threshold size, with the last one being the shortest. For example, the previous form of the **cable upstream fragment-force** command fragments a concatenated frame of 9000 into 5 frames of 1800. The new form of the **cable upstream fragment-force** command fragments a concatenated frame of 9000 into frames of 2000, 2000, 2000, 2000, and 1000.

Do not use a fragment size greater than 1,600 bytes on the Cisco uBR10-MC5X20S cable interface line card running Cisco IOS Release 12.3(23)BC1. Do not use a fragment size greater than 2,000 bytes on the Cisco uBR10-MC5X20U cable interface line card, and do not use a fragment size greater than 3,500 bytes on all other cable interface line cards, unless otherwise instructed by a Cisco TAC engineer.

When using DOCSIS concatenation, you might need to change the **cable default-phy-burst** command from its default size, so that multiple frames can be concatenated into a maximum-sized burst. If you set the **cable default-phy-burst** command to zero, the max burst then becomes the lowest of 255 mini-slots, the maximum concatenated burst setting in the DOCSIS configuration file, or the value of the long data grant burst that is specified in the upstream's profile.

When you set the **cable default-phy-burst** command to zero, the CMTS fragments large requests into big chunks and the cable modems will not be able to register on specific groupings of upstream interfaces due to the large fragment size. We recommend the use of a fragment size of 2,000 bytes, if you want to set the **cable default-phy-burst** command to zero to provide upstream speed of above 5 Mbps.

**Caution**

Ensure that the *number-of-fragments* parameter is large enough to keep the size of each fragment of a maximum-sized burst less than the 1,600 bytes or 2,000 bytes or 3,500 bytes specified above. If fragments are too large, the cable modem might not be able to come online or pass traffic.

**Note**

The *number-of-fragments* option has been deprecated from Cisco IOS Release 12.2(21a)BC, 12.2(33)SCB, and later releases.

**Note**

Do not confuse DOCSIS Layer 2 fragmentation with IP Layer 3 fragmentation.

**Examples**

The following example shows how to enable DOCSIS fragmentation on frames that are 1,500 bytes or larger, using four fragments per frame:

```
Router# configure terminal
Router(config)# interface c2/0
Router(config-if)# cable upstream 0 fragment-force 1500 4
Router(config-if)#
```

The following example shows how to disable the forced fragmentation of DOCSIS frames on an upstream. This also resets the *fragment-threshold* parameter to default value.

```
Router# configure terminal
Router(config)# interface c5/1/0
Router(config-if)# no cable upstream 0 fragment-force
Router(config-if)#
```

#### Cisco IOS Release 12.2(21a)BC, 12.2(33)SCB and Later

The following example shows how to enable DOCSIS fragmentation on frames that are 2,000 bytes or larger:

```
Router# configure terminal
Router(config)# interface c2/0
Router(config-if)# cable upstream 0 fragment-force 2000
Router(config-if)#
```

#### Related Commands

| Command                             | Description                                                                                                     |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>cable default-phy-burst</b>      | Specifies a value for the upstream Maximum Traffic Burst parameter for CMs that do not specify their own value. |
| <b>cable upstream fragmentation</b> | Enables fragmentation of DOCSIS frames on a particular upstream.                                                |



# cable upstream freq-adj averaging

To specify the percentage of frequency adjustment packets that is required to change the adjustment method from the regular power-adjustment method to the noise power-adjustment method, use the **cable upstream freq-adj averaging** command in cable interface configuration mode. To disable power adjustments, use the **no** form of this command.

**cable upstream *n* freq-adj averaging *% of frequency adjustment***

**no cable upstream *n* freq-adj averaging**

|                    |                                  |                                                                                                                                                                                                   |
|--------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i>                         | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                       |
|                    | <i>% of frequency adjustment</i> | Specifies the percentage of frequency-adjustment packets required to switch from the regular power-adjustment method to the noise power-adjustment method. Valid range is from 10 to 100 percent. |

|                 |                               |
|-----------------|-------------------------------|
| Command Default | No default behavior or values |
|-----------------|-------------------------------|

|               |                                                |
|---------------|------------------------------------------------|
| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|

|                 |          |                              |
|-----------------|----------|------------------------------|
| Command History | Release  | Modification                 |
|                 | 12.0(7)T | This command was introduced. |

**Examples** The following example shows how to change the power-adjustment method when the frequency-adjustment packet count reaches 50 percent:

```
Router(config-if)# cable upstream 0 freq-adj averaging 50
```

|                  |                                    |                                                                                      |
|------------------|------------------------------------|--------------------------------------------------------------------------------------|
| Related Commands | Command                            | Description                                                                          |
|                  | <b>cable upstream power-adjust</b> | Controls power-adjustment methods on the Cisco CMTS.                                 |
|                  | <b>show cable flap-list</b>        | Displays a list of CMs that have exceeded the threshold number of power adjustments. |
|                  | <b>show cable modem</b>            | Displays CM configuration settings.                                                  |

# cable upstream frequency

To enter a fixed frequency of the upstream radio frequency (RF) carrier for an upstream port, use the **cable upstream frequency** command in cable interface configuration mode. To restore the default value for this command, use the **no** form of this command.

**cable upstream *n* frequency *up-freq-hz***

**no cable upstream *n* frequency *up-freq-hz***

|                           |                   |                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i>          | Specifies the upstream port number on the cable interface line card for which you want to assign an upstream frequency. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                                                                                |
|                           | <i>up-freq-hz</i> | The upstream center frequency is configured to a fixed Hertz (Hz) value. The valid upstream frequency range is 5 MHz (5000000 Hz) to 42 MHz (42000000 Hz), 55 MHz (55000000 Hz), or 65 MHz (65000000 Hz), depending on the cable interface line card being used. If you wish to have the Cisco CMTS dynamically specify a center frequency for the given upstream interface, do not enter any frequency value. |

|                        |                               |
|------------------------|-------------------------------|
| <b>Command Default</b> | Dynamic (not fixed frequency) |
|------------------------|-------------------------------|

|                      |                                                |
|----------------------|------------------------------------------------|
| <b>Command Modes</b> | Interface configuration (cable interface only) |
|----------------------|------------------------------------------------|

| <b>Command History</b> | <b>Release</b>        | <b>Modification</b>                                                                                                                                    |
|------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 11.3 XA               | This command was introduced.                                                                                                                           |
|                        | 12.0(13)SC            | Support for the higher EuroDOCSIS upstream range (5 to 65 MHz) was introduced for the Cisco uBR-MC16E cable interface line card.                       |
|                        | 12.1(4)EC, 12.2(4)BC1 | Support for the higher EuroDOCSIS upstream range (5 to 65 MHz) was introduced for the Cisco uBR7111E and Cisco uBR7114E routers.                       |
|                        | 12.2(15)BC2           | The allowable range of frequencies that you can select with this command is determined by the configuration of the <b>upstream freq-range</b> command. |

**Usage Guidelines** The upstream channel frequency of your RF output must be set to comply with the expected input frequency of your cable interface line card. To configure an upstream channel frequency, you may:

- Configure a fixed frequency between the allowable ranges and enable the upstream port, or
- Create a global spectrum group, assign the interface to it, and enable the upstream port.

The allowable range for the upstream channel frequency depends on the cable interface line card and Cisco IOS software release being used. See [Table 22](#) for the currently supported values.

**Table 22** Allowable Frequency Range for the cable upstream frequency Command

| Frequency Range | Supported Cable Interfaces                                                                                                         | Minimum Cisco IOS Releases                                 |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| 5 to 42 MHz     | All supported cable interfaces                                                                                                     | All releases supported for the Cisco CMTS                  |
| 5 to 55 MHz     | Cisco uBR-MC16U/X,<br>Cisco uBR-MC28U/X,<br>Cisco uBR-MC5X20U                                                                      | Cisco IOS Release 12.2(15)BC2                              |
| 5 to 65 MHz     | Cisco uBR-MC16E,<br>Cisco uBR-MC16U/X,<br>Cisco uBR-MC28U/X,<br>Cisco uBR-MC5X20U,<br>Cisco uBR7111E and<br>Cisco uBR7114E routers | Cisco IOS Release 12.0(13)SC,<br>12.1(4)EC, and 12.2(4)BC1 |

**Note**

In Cisco IOS Release 12.2(15)BC2 and later releases, the allowable range of frequencies that you can select with the **cable upstream frequency** command is determined by the configuration of the **upstream freq-range** command.

**Tip**

If both a Cisco uBR-MC16E cable interface line card and a Cisco uBR-MC16C and/or a Cisco uBR-MC16S cable interface line card are present in the chassis, a spectrum group in the 42 MHz to 65 MHz range should not be assigned.

To configure the default upstream frequency (which is no fixed frequency), enter the **cable upstream n frequency** command without specifying a center frequency.

**Examples**

The following example shows how to configure the upstream center frequency for port 0, located in slot 6, to 5,700,000 Hz:

```
Router(config-if)# cable upstream 0 frequency 5700000
Router(config-if)# exit
Router(config)# exit
Router# show running-config | include frequency
cable upstream 0 frequency 5696000
Router#
```

**Note**

Cisco cable interface line cards always program the upstream's center frequency in 16 KHz increments, and this is the frequency displayed by the lines added to the router's configuration and by the **show controllers cable upstream** command. For example, if you use the **cable upstream frequency** command to specify a center frequency of 27 MHz (**cable upstream x frequency 27000000**), the actual center frequency will be 27.008 MHz, which is the next highest 16 KHz boundary. The configuration file will therefore show the line **cable upstream 0 frequency 27008000**.

The following example shows how to configure the upstream center frequency to a frequency (54,700,000 Hz) within the extended Japanese frequency range:

```
Router# configure terminal
Router(config)# upstream freq-range japanese
```

■ cable upstream frequency

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 0 frequency 54000000
Router(config-if)# exit
Router(config)# exit
Router#
```

The following example shows how to allow the Cisco CMTS to dynamically specify a center frequency for the upstream port 0:

```
Router(config-if)# no cable upstream 0 frequency
```

The following command example from Cisco IOS Release 12.3 BC illustrates the allowable upstream frequency range in Hz:

```
Router(config-if)# cable upstream 3 frequency ?
<5000000-55000000> Upstream Frequency in Hz
```

Related Commands

| Command                                            | Description                                                                                     |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>cable spectrum-group (global configuration)</b> | Creates spectrum groups, which contain one or more upstream frequencies.                        |
| <b>show controllers cable</b>                      | Displays information about the cable interface, including the upstream center frequency.        |
| <b>upstream freq-range</b>                         | Configures the Cisco CMTS router for the range of frequencies that are acceptable on upstreams. |

# cable upstream hopping blind

To override hop decisions, use the **cable upstream hopping blind** command in cable interface configuration mode. To stop blind hopping, enter the **no** form of this command.

**cable upstream *n* hopping blind**

**no cable upstream *n* hopping blind**

|                           |          |                                                                                                                                                                          |
|---------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i> | Specifies the upstream port for which blind frequency hopping will be activated. Valid values start with 0 for the first upstream port on the cable interface line card. |
|---------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                        |                                 |
|------------------------|---------------------------------|
| <b>Command Default</b> | Disabled (hopping is optimized) |
|------------------------|---------------------------------|

|                      |                                                |
|----------------------|------------------------------------------------|
| <b>Command Modes</b> | Interface configuration (cable interface only) |
|----------------------|------------------------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.0(7)XR2     | This command was introduced. |

|                         |                                                                                              |
|-------------------------|----------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Enter this command to override the hardware spectrum manager's decision to optimize hopping. |
|-------------------------|----------------------------------------------------------------------------------------------|

**Note**

Do not use this command unless you have a specific reason to disable optimum hopping configurations. For example, if you are experimenting with a Cisco uBR-MC16S or Cisco uBR-MC5X20S/U card, you can use this command to enforce blind hopping on individual upstream channels.

|                 |                                                                                  |
|-----------------|----------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to specify hopping blind on the upstream port 0: |
|-----------------|----------------------------------------------------------------------------------|

```
Router(config-if)# cable upstream 0 hopping blind
```

|                         |                                                    |                                                                                                                                                    |
|-------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>                                     | <b>Description</b>                                                                                                                                 |
|                         | <b>cable monitor</b>                               | Configures preset modulation profiles that you can apply to one or more upstream cable interfaces when you identify and configure spectrum groups. |
|                         | <b>cable spectrum-group (global configuration)</b> | Configures spectrum management characteristics for the given spectrum group.                                                                       |
|                         | <b>cable upstream channel-width</b>                | Specifies the channel width of the given upstream cable interface.                                                                                 |
|                         | <b>cable upstream frequency</b>                    | Specifies the center frequency for a given upstream cable interface.                                                                               |

| Command                           | Description                                                         |
|-----------------------------------|---------------------------------------------------------------------|
| <b>cable upstream power-level</b> | Specifies the upstream cable interface receive power level in dBmV. |
| <b>cable upstream shutdown</b>    | Activates or shuts down a specified upstream cable interface.       |

# cable upstream hop-priority

To configure the priority of the corrective actions to be taken when a frequency hop is necessary due to ingress noise on the upstream, use the appropriate **cable upstream hop-priority** command in cable interface configuration mode.

**cable upstream *n* hop-priority frequency modulation channel-width**

**cable upstream *n* hop-priority modulation frequency channel-width**

**cable upstream *n* hop-priority frequency channel-width modulation**

## Syntax Description

|                                             |                                                                                                                                                                        |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                                    | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card.                                                   |
| <b>frequency, modulation, channel-width</b> | Specifies the priority of corrective actions to be taken when ingress noise occurs on a downstream.                                                                    |
| <b>Note</b>                                 | The <b>channel-width</b> option must come after the <b>frequency</b> option, either immediately or after the <b>modulation</b> option, as shown in the above examples. |

## Command Default

The default priority is **frequency, modulation, and channel-width**.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release                 | Modification                                                                                                      |
|-------------------------|-------------------------------------------------------------------------------------------------------------------|
| 12.1(7)CX1              | This command was introduced for Cisco uBR7200 series routers using the Cisco uBR-MC16S cable interface line card. |
| 12.2(8)BC2              | Support was added for the Cisco uBR10012 router and the Cisco uBR-LCP2-MC16S cable interface line card.           |
| 12.2(11)CY, 12.2(11)BC3 | Support was added for the Cisco uBR10-MC5X20S cable interface line card on the Cisco uBR10012 router.             |
| 12.2(15)BC2             | Support was added for the Cisco uBR10-MC5X20U cable interface line card on the Cisco uBR10012 router.             |

## Usage Guidelines

This command specifies the priority of the corrective actions that should be taken when a frequency hop is necessary to correct excessive ingress noise on an upstream. For example, if the upstream on a Cisco uBR-MC16S card is set for the default settings (**frequency, modulation, and channel-width**), the following occurs when the upstream noise exceeds the CNR threshold value for the current modulation profile:

1. The Cisco uBR-MC16S changes to a new frequency, if a clean frequency is available in its spectrum group.

2. If no clean frequency is available, the Cisco uBR-MC16S uses the Dynamic Upstream Modulation feature to switch the upstream to the secondary modulation profile.
3. If the noise levels still exceed the CNR threshold value for the secondary modulation profile, and if the upstream has been configured for a range of channel widths, the Cisco uBR-MC16S narrows the channel width of the upstream by half. If the noise levels are still excessive, the channel width is again cut in half, and this process continues until a clean upstream is found or the bandwidth is reduced to the minimum channel width that has been configured using the **cable upstream channel-width** command.

Allowable DOCSIS channel widths are 3.2 MHz, 1.6 MHz, 800 KHz, 400 KHz, and 200 KHz. If the channel width drops to 200 KHz, but the noise still exceeds the SNR threshold, the CMs go offline.



**Note** The default specifies only a single channel width of 1.6 MHz. If this is not changed to specify a range of allowable channel widths (using the **cable upstream channel-width** command), the Cisco uBR-MC16S does not attempt to change the channel width.

To use the Dynamic Upstream Modulation feature, you must first create two modulation profiles (using the **cable modulation-profile** command) and assign them to the upstream (using the **cable upstream modulation-profile** command).

## Examples

The following example shows that when ingress noise on the upstream exceeds the threshold allowed for the primary modulation profile, the Cisco uBR-MC16S line card should first switch to the secondary modulation profile, then try frequency hopping, and if that fails to correct problem, to finally try narrowing the channel width:

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 0 hop-priority modulation frequency channel-width
Router(config-if)# exit
Router(config)#
```

## Related Commands

| Command                                  | Description                                                                                                                  |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>          | Creates a cable modulation profile.                                                                                          |
| <b>cable upstream channel-width</b>      | Configures an upstream for a range of allowable channel widths.                                                              |
| <b>cable upstream modulation-profile</b> | Configures an upstream for one modulation profile (static profile) or two modulation profiles (Dynamic Upstream Modulation). |
| <b>show cable hop</b>                    | Displays the current hop period and threshold for an upstream, along with other statistics.                                  |
| <b>show cable modulation-profile</b>     | Displays the cable modulation profiles that have been created.                                                               |



# cable upstream ingress-noise-cancellation

To configure how often a cable interface line card should train its noise-cancellation circuitry so as to adjust to noise levels on the upstream, use the **cable upstream ingress-noise-cancellation** command in cable interface configuration mode. To disable the ingress noise cancellation feature, use the **no** form of this command.

**cable upstream** *n* **ingress-noise-cancellation** *interval*

**no cable upstream** *n* **ingress-noise-cancellation**

|                           |                 |                                                                                                                             |
|---------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i>        | Upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.               |
|                           | <i>interval</i> | Triggering interval, in milliseconds. The valid range is 10 to 3000 milliseconds, with a default value of 100 milliseconds. |

**Command Default** The default interval is 100 milliseconds.

**Command Modes** Interface configuration (config-if)

| <b>Command History</b> | <b>Release</b>                                                                                                                                          | <b>Modification</b>                                                                                                                    |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.2(15)CX                                                                                                                                              | This command was introduced for the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line cards on the Cisco uBR7246VXR router. |
|                        | 12.3(17b)BC4                                                                                                                                            | Support was added for the Cisco uBR10-MC5X20H broadband processing engine on the Cisco uBR10012 router.                                |
|                        | 12.2(33)SCA                                                                                                                                             | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                     |
|                        | 12.2(23)BC10 and later<br>12.2(33)SCB11 and later<br>12.2(33)SCC6 and later<br>12.2(33)SCD6 and later<br>12.2(33)SCE and later<br>12.2(33)SCF and later | The default interval was changed to 100 milliseconds.                                                                                  |

## Usage Guidelines



### Note

This command is available only on the Cisco uBR10-MC5X20H BPE, Cisco uBR-MC16U/X, and Cisco uBR-MC28U/X cable interface line cards. It cannot be used on other cable interface line cards.

Cable interface line cards, such as the Cisco uBR-MC28U/X cards, contain advanced hardware-based noise cancellation circuitry that digitally removes in-channel impairments such as ingress, common path distortion, and certain types of impulse noise. To configure how often these line cards should train their noise cancellation circuitry, so as to adapt to changes in the noise types and levels, use the **cable upstream ingress-noise-cancellation** command.

When you enable ingress noise cancellation on an upstream, the Cisco CMTS periodically schedules a 256-symbol idle slot on the upstream channel. The *interval* option specified in the **cable upstream ingress-noise-cancellation** command determines how often this idle slot is generated.

The default for BPE cards is for the card to train its circuitry every 100 milliseconds. The smaller the triggering interval, the faster the card can adjust to changes in ingress noise, which makes the upstream more robust to noise problems, but at the cost of decreasing bandwidth on the upstream channel. To determine the bandwidth cost, in percentage of raw bandwidth, use the following formula:

$$(256 / \text{interval}) / \text{channel-symbol-rate}$$

where *interval* is the time period in milliseconds specified by the **cable upstream ingress-noise-cancellation** command, and *channel-symbol-rate* is the symbol rate in kilohertz. For example, if the upstream is using a 2.56 MHz channel rate and a noise cancellation interval of 10 milliseconds, the bandwidth cost is 1% of the total raw bandwidth:

$$(256 / 10) / 2560 = 0.01 \text{ (1\% of bandwidth)}$$

### Broadband Processing Engine Support

The **cable upstream ingress-noise-cancellation** command is required on the Cisco uBR10-MC5X20H broadband processing engine (BPE) to enable ingress noise cancellation.

The Cisco uBR10-MCX520S/U BPEs have ingress noise cancellation capability enabled by default, so no configuration of ingress noise cancellation is available in the Cisco IOS software for these cards.

However, for configuration compatibility in support of high availability among Cisco uBR10-MC5X20S/U/H cards, the Cisco IOS software will accept configuration of the **cable upstream ingress-noise-cancellation** command for these BPEs without generating any warning or error when synchronizing the configuration.

### Examples

The following example shows how to configure the first upstream on a Cisco uBR-MC16U/X or Cisco uBR-MC28U/X card to perform ingress noise cancellation every 300 milliseconds:

```
interface cable 5/0
 cable upstream 0 ingress-noise-cancellation 300
```

### Related Commands

|                                          |                                                                                          |
|------------------------------------------|------------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>          | Defines a modulation profile for use on the router.                                      |
| <b>cable upstream channel-width</b>      | Specifies an upstream channel width for an upstream port.                                |
| <b>cable upstream docsis-mode</b>        | Configures an upstream to use either DOCSIS 1.x or DOCSIS 2.0 modulation profiles.       |
| <b>cable upstream frequency</b>          | Enters a fixed frequency of the upstream RF carrier for an upstream port.                |
| <b>cable upstream minislot-size</b>      | Specifies the minislot size (in ticks) for a specific upstream interface.                |
| <b>cable upstream modulation-profile</b> | Assigns one or two modulation profiles to an upstream port.                              |
| <b>cable upstream power-level</b>        | Sets the input power level for the upstream RF carrier in decibels per millivolt (dBmV). |

|                                          |                                                                 |
|------------------------------------------|-----------------------------------------------------------------|
| <b>show cable hop</b>                    | Displays CM configuration settings.                             |
| <b>show cable modulation-profile</b>     | Displays the modulation profile information for a Cisco CMTS.   |
| <b>show interface cable mac-schedule</b> | Displays the current time-slot scheduling state and statistics. |
| <b>show interface cable sid</b>          | Displays cable interface information.                           |

# cable upstream load-balance group

To assign an upstream to a load-balance group, use the **cable upstream load-balance group** command in interface configuration mode. To remove an upstream from a load-balance group, use the **no** form of this command.

**cable upstream** *uport* **load-balance group** *n*

**no cable upstream** *uport* **load-balance group** *n*

## Syntax Description

|              |                                                                                                                                                                                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>uport</i> | Specifies the upstream port that should be assigned to the load-balance group. Upstream port values start with 0 and end with a value that depends on the number of upstream ports on the cable interface line card.                                    |
| <i>n</i>     | Specifies the number of the load-balance group to which the upstream should be assigned. In Cisco IOS Release 12.2(33)SCE3 and earlier, the valid range is from 1 to 80. In Cisco IOS Release 12.2(33)SCE4 and later, the valid range is from 1 to 256. |

## Command Default

An upstream is not assigned to any load-balance groups. If you use the **cable load-balance group (interface configuration)** command to assign a downstream interface to a load-balance group, all its upstreams are automatically assigned to the same group until you use the **cable upstream load-balance group** command to reassign an upstream to a different group.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release      | Modification                                                                     |
|--------------|----------------------------------------------------------------------------------|
| 12.2(15)BC1  | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers. |
| 12.2(33)SCE4 | The valid range for the load balance group was changed.                          |

## Usage Guidelines

After you have used the **cable load-balance group (global configuration)** command to initially create and configure a load-balance group, use the **cable upstream load-balance group** command to assign this load-balance group to an upstream. This enables the cable interface to begin participating in load-balancing operations.



### Tip

Use the **cable load-balance group (interface configuration)** command to assign this load-balance group to a downstream.

The following rules apply when creating and assigning load-balance groups:

- A downstream or upstream can belong to only one load-balance group.

- All downstreams and upstreams in a load-balance group must share physical radio frequency (RF) connectivity to the same group of cable modems. Downstreams can be in a separate load-balance group than upstreams, but all downstreams or all upstreams that have the same RF physical connectivity must be members of the same load-balance group. You cannot distribute downstreams or upstreams that share physical connectivity across multiple load-balance groups.
- Load balancing is done only on a per-chassis basis—all interfaces in a load-balance group must be in the same chassis.

### Examples

The following example shows how to assign the first four upstreams for cable interface 5/1 to load balance group 14:

```
Router# config terminal
Router(config)# interface cable 5/1/0
Router(config-if)# cable upstream 0 load-balance group 14
Router(config-if)# cable upstream 1 load-balance group 14
Router(config-if)# cable upstream 2 load-balance group 14
Router(config-if)# cable upstream 3 load-balance group 14
Router(config-if)#
```

### Associated Features

The **cable upstream load-balance group** command is used to configure the following feature:

[Load Balancing and Dynamic Channel Change on the Cisco CMTS Routers](#)

### Related Commands

| Command                                                   | Description                                                                                                                           |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance exclude</b>                         | Excludes a particular cable modem, or all cable modems from a particular vendor, from one or more types of load-balancing operations. |
| <b>cable load-balance group (global configuration)</b>    | Creates and configures a load-balance group.                                                                                          |
| <b>cable load-balance group (interface configuration)</b> | Assigns a downstream to a load-balance group.                                                                                         |
| <b>cable load-balance group interval</b>                  | Configures the frequency of the load-balancing policy updates.                                                                        |
| <b>cable load-balance group policy ugs</b>                | Configures how the Cisco CMTS should load balance cable modems with active unsolicited grant service (UGS) service flows.             |
| <b>cable load-balance group threshold</b>                 | Configures the threshold values that a load-balance group should use for load-balancing operations.                                   |
| <b>clear cable load-balance</b>                           | Clears the counters or state machine used to track load-balancing operations.                                                         |
| <b>show cable load-balance</b>                            | Displays real-time statistical and operational information for load-balancing operations.                                             |

# cable upstream maintain-psd

To require DOCSIS 2.0 CMs on an A-TDMA-only upstream to maintain a constant power spectral density (PSD) after a modulation rate change, use the **cable upstream maintain-psd** command in cable interface configuration mode. To return to the default behavior, so that CMs do not need to maintain their power spectral density, use the **no** form of this command.

**cable upstream** *uport* **maintain-psd**

**no cable upstream** *uport* **maintain-psd**

## Syntax Description

|              |                                                                                                                                                                                     |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>uport</i> | Specifies the upstream port to be configured. Upstream port values start with 0 and end with a value that depends on the number of upstream ports on the cable interface line card. |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

Cable modems are not required to maintain their power spectral density after a modulation rate change (**no cable upstream maintain-psd**)



### Note

In Cisco IOS Release 12.2(15)BC2 and later releases, this command is automatically removed from the configuration when you configure an upstream for a TDMA-only or mixed TDMA/A-TDMA configuration.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release     | Modification                                                                                                                           |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)CX  | This command was introduced to support DOCSIS 2.0 operations on the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line card. |
| 12.2(15)BC2 | Support was added for DOCSIS 2.0 operations on the Cisco uBR-MC5X20S/U cable interface line cards.                                     |

## Usage Guidelines

Use this command to specify whether DOCSIS 2.0 CMs should maintain their power spectral density when the Cisco CMTS changes their upstream modulation rate in an upstream channel descriptor (UCD) message. When you configure an upstream with the **cable upstream maintain-psd** command, the Cisco CMTS sets TLV 15 (Maintain Power Spectral Density) to ON in the UCD messages it sends to the CMs on that upstream.

When TLV 15 is on, and when the new UCD specifies a new upstream modulation rate for the CM, the CM must change its transmit power level to keep its power spectral density as close as possible to what it was before the modulation rate change. The CM must maintain this power spectral density until the CMTS sends a power adjustment command in a Ranging-Response (RNG-RSP) message.

The default configuration (**no cable upstream maintain-psd**) configures TLV 15 to OFF, and CMs are not required to maintain their power spectral density after a modulation rate change. However, per the DOCSIS specifications, the CMs continue to maintain constant total input power on the upstream.

**Note**

This command affects only DOCSIS 2.0 CMs that are online an upstream that is configured for the DOCSIS 2.0 A-TDMA-only mode. This command has no effect on DOCSIS 1.0 and DOCSIS 1.1 CMs, which will continue to maintain constant total input power on the upstream, per the DOCSIS 1.x specifications.

**Examples**

The following example shows how to configure four upstreams on a cable interface line card to require cable modems to maintain a constant power spectral density after a modulation rate change.

```
Router# configure terminal
Router(config)# interface cable c6/1/0
Router(config-if)# cable upstream 0 maintain-psd
Router(config-if)# cable upstream 1 maintain-psd
Router(config-if)# cable upstream 2 maintain-psd
Router(config-if)# cable upstream 3 maintain-psd
Router(config-if)# exit
Router(config)# exit
Router#
```

The following example shows how to configure an upstream for the default behavior, which is that CMs are not required to maintain a constant power spectral density after a modulation rate change, but do continue to maintain constant total input power levels on the upstream.

```
Router# configure terminal
Router(config)# interface cable c5/1/0
Router(config-if)# no cable upstream 0 maintain-psd
Router(config-if)# exit
Router(config)# exit
Router#
```

**Related Commands**

| Command                           | Description                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------|
| <b>cable upstream docsis-mode</b> | Configures an upstream to use either DOCSIS 1.x or DOCSIS 2.0 modulation profiles. |

# cable upstream max-channel-power-offset

To set the power budget offset value on the Cisco CMTS router for the reduced upstream channel set assignment, use the **cable upstream max-channel-power-offset** command in cable interface configuration mode. To disable this configuration, use the **no** form of this command.

**cable upstream max-channel-power-offset** *dB-value*

**no cable upstream max-channel-power-offset** *dB-value*

|                           |                 |                                                                                                    |
|---------------------------|-----------------|----------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>dB-value</i> | Decibel value for the upstream channel transmit power. The range is from 1 to 6. The default is 3. |
|---------------------------|-----------------|----------------------------------------------------------------------------------------------------|

|                        |                                                                       |
|------------------------|-----------------------------------------------------------------------|
| <b>Command Default</b> | The power budget offset is configured with the default value of 3 dB. |
|------------------------|-----------------------------------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

| <b>Command History</b> | <b>Release</b>                 | <b>Modification</b>          |
|------------------------|--------------------------------|------------------------------|
|                        | Cisco IOS Release 12.2(33)SCE3 | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The threshold value specified for the power budget offset (max-channel-power-offset) must be less than the power threshold value (power-adjust continue) that determines the value of the Ranging Status field in the Ranging Response (RNG-RSP) messages that the Cisco CMTS router sends to the cable modem. You can specify the power threshold value using the <b>cable upstream power-adjust</b> command. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                                                            |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable the Cisco CMTS router to reduce the channel set assignment based on the total power budget of the cable modem in Cisco IOS Release 12.2(33)SCE3: |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# interface cable 7/0/0
Router (config-if)# cable upstream max-channel-power-offset 5
```

| <b>Related Commands</b> | <b>Command</b>                 | <b>Description</b>                                                                                |
|-------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|
|                         | <b>cable tx-power-headroom</b> | Specifies the extended transmit power on the Cisco CMTS router.                                   |
|                         | <b>show cable modem</b>        | Displays transmit power values for each assigned upstream channel along with cable modem details. |



# cable upstream max-codes-per-subframe

To specify the upper limit to override the maximum value of codes-per-subframe defined in the individual modulation profile setting for an upstream channel, use the **cable upstream max-codes-per-subframe** command in cable interface configuration mode. To specify the default value of 2 to maximum codes-per-subframe, use the **no** form of this command.

**cable upstream** *n* **max-codes-per-subframe** *code*

**no cable upstream** *n* **max-codes-per-subframe**

|                    |             |                                                                                                                      |
|--------------------|-------------|----------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i>    | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card. |
|                    | <i>code</i> | Specifies the number of codes-per-subframe. Valid values range from 1 to 128, with a default value of 2.             |

|                 |                                                                                                                                       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Command Default | The maximum codes per subframe setting cannot be applied if the Synchronous Code Division Multiple Access (S-CDMA) is not configured. |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------|

|               |                                     |
|---------------|-------------------------------------|
| Command Modes | Interface configuration (config-if) |
|---------------|-------------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

|                  |                                                                                                                                                                                                                      |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command is applicable only for S-CDMA channels. You should configure S-CDMA to apply the the maximum codes-per-subframe setting. The number of codes-per-subframe should not exceed the number of active codes. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                            |
|----------|--------------------------------------------------------------------------------------------|
| Examples | The following example sets the number of codes-per-subframe to 128 on the upstream port 0: |
|----------|--------------------------------------------------------------------------------------------|

```
Router(config)# interface cable 7/0/4
Router(config-if)# cable upstream 0 max-codes-per-subframe 128
Router(config-if)#
```

| Related Commands | Command                                  | Description                                                                |
|------------------|------------------------------------------|----------------------------------------------------------------------------|
|                  | <b>cable upstream active-codes</b>       | Specifies the number of active codes allowed on an upstream channel.       |
|                  | <b>cable upstream codes-per-minislot</b> | Specifies the number of codes-per-minislot allowed on an upstream channel. |
|                  | <b>cable upstream spreading-interval</b> | Specifies the spreading interval for S-CDMA on an upstream channel.        |

# cable upstream max-interleave-step

To specify the upper limit to override the maximum interleave step for each burst defined in the modulation profile for the upstream channel, use the **cable upstream max-interleave-step** command in cable interface configuration mode. To specify the default interleave step size of 1, use the **no** form of this command.

**cable upstream** *n* **max-interleave-step** *max-interleave-step*

**no cable upstream** *n* **max-interleave-step**

|                           |                            |                                                                                                                      |
|---------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i>                   | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card. |
|                           | <i>max-interleave-step</i> | Specifies the maximum number of interleave steps. Valid values range from 1 to 31, with a default value of 1.        |

**Command Default** The maximum interleave step setting cannot be applied if the Synchronous Code Division Multiple Access (S-CDMA) feature is not configured.

**Command Modes** Interface configuration (config-if)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCC    | This command was introduced. |

**Usage Guidelines** This command is applicable only for S-CDMA channels and the command limits the maximum number of interleave steps for a given upstream port. The *max-interleave-step* value should be less than the *spreading-interval* value specified using the **cable upstream spreading-interval** command.

**Examples** The following example sets the number of interleave steps to 31 on the upstream port 0:

```
Router(config)# interface cable 7/0/4
Router(config-if)# cable upstream 0 max-interleave-steps 31
Router(config-if)#
```

| <b>Related Commands</b> | <b>Command</b>                          | <b>Description</b>                                                                  |
|-------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|
|                         | <b>cable upstream active-codes</b>      | Specifies the number of active codes that can be configured on an upstream channel. |
|                         | <b>cable upstream codes-perminislot</b> | Specifies the number of codes-per-minislot allowed on an upstream channel.          |

|                                                  |                                                                                                                                                     |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable upstream<br/>max-codes-per-subframe</b> | Specifies the upper limit and the maximum value of codes-per-subframe defined in the individual modulation profile setting for an upstream channel. |
| <b>cable upstream<br/>spreading-interval</b>     | Specifies the spreading interval for SCDMA on an upstream channel.                                                                                  |

# cable upstream max-logical-chans

To specify the number of logical channels on a physical port, use the **cable upstream max-logical-chans** command in cable interface configuration mode. To disable the use of multiple logical channels, use the **no** form of this command.

**cable upstream *n* max-logical-chans *code***

**no cable upstream *n* max-logical-chans**

|                    |             |                                                                                                                      |
|--------------------|-------------|----------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i>    | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card. |
|                    | <i>code</i> | Specifies the number of logical channels per port. Valid values are 1 and 2.                                         |

|                 |                                                                                                                                     |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Command Default | The maximum logical channels setting cannot be applied if the Synchronous Code Division Multiple Access (S-CDMA) is not configured. |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|

|               |                                     |
|---------------|-------------------------------------|
| Command Modes | Interface configuration (config-if) |
|---------------|-------------------------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCC | This command was introduced. |

**Usage Guidelines**

The **cable upstream max-logical-chans** command limits the number of logical channels per port on an upstream channel. The default value is 1.

When two logical channels are configured through **cable upstream max-logical-chans** command, both logical channels are mapped to the same physical port specified and the physical upstream bandwidth is shared between the two logical channels. However, from the cable modem perspective, each logical channel appears as an independent upstream channel.

When multiple logical channels are configured, the upstream related commands are categorized into two groups: physical port level and logical channel level.

**Physical Port Level**

Physical port level commands use the format of **cable upstream *n***, where *n* denotes the physical port number.

**Logical Channel Level**

Logical channel level commands use the format of **cable upstream *n m***, where *n* denotes the physical port number, and *m* denotes the logical channel index number of 0 or 1.



Note

Multiple logical channels and Spectrum groups cannot be configured on the same upstream port.

The following commands are supported at the logical channel level:

- **cable upstream active-codes**
- **cable upstream attribute-mask**
- **cable upstream codes-per-minislot**
- **cable upstream concatenation**
- **cable upstream data-backoff**
- **cable upstream description**
- **cable upstream differential-encoding**
- **cable upstream docsis-mode**
- **cable upstream equalization-coefficient**
- **cable upstream fec**
- **cable upstream fragment-force**
- **cable upstream fragmentation**
- **cable upstream freq-adjust**
- **cable upstream max-codes-per-subframe**
- **cable upstream max-interleave-step**
- **cable upstream modulation-profile**
- **cable upstream power-adjust**
- **cable upstream range-backoff**
- **cable upstream rate-adapt**
- **cable upstream rate-limit**
- **cable upstream scheduling type**
- **cable upstream scrambler**
- **cable upstream shutdown**
- **cable upstream spreading-interval**
- **cable upstream threshold**
- **cable upstream unfrag-slot-jitter**

**Note**

The above logical channel level commands are not available at the physical port level, when logical channels are configured. However, the **cable upstream shutdown** and **cable upstream threshold** commands operate both at the physical and at the logical channel level.

The physical upstream port level commands such as **cable upstream frequency** and **cable upstream channel-width** affects all logical channels configured under a physical port.

**Examples**

The following example sets two logical channels on the upstream port 0:

```
Router(config)# interface cable 7/0/4
Router(config-if)# cable upstream 0 max-logical-chans 2
Router(config-if)#
```

| Related Commands | Command                                        | Description                                                                                                                                                                              |
|------------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                                                |                                                                                                                                                                                          |
|                  | <b>cable upstream attribute-mask</b>           | Specifies the upstream attribute mask in hexadecimal format.                                                                                                                             |
|                  | <b>cable upstream codes-per-minislot</b>       | Specifies the number of codes-per-minislot allowed on an upstream channel.                                                                                                               |
|                  | <b>cable upstream concatenation</b>            | Enables DOCSIS concatenation at the CMTS.                                                                                                                                                |
|                  | <b>cable upstream data-backoff</b>             | Specifies automatic or fixed start and stop values for data backoff.                                                                                                                     |
|                  | <b>cable upstream description</b>              | Assigns arbitrary labels to the upstreams on the cable interfaces.                                                                                                                       |
|                  | <b>cable upstream differential-encoding</b>    | Enables differential encoding on upstream traffic to a specified cable interface.                                                                                                        |
|                  | <b>cable upstream docsis-mode</b>              | Configures an upstream to use DOCSIS 1.x or DOCSIS 2.0 or DOCSIS 3.0 modulation profiles.                                                                                                |
|                  | <b>cable upstream equalization-coefficient</b> | Enables the use of a DOCSIS 1.x or DOCSIS 2.0 or DOCSIS 3.0 pre-equalization coefficient on an upstream port.                                                                            |
|                  | <b>cable upstream fec</b>                      | Enables upstream forward error correction.                                                                                                                                               |
|                  | <b>cable upstream fragment-force</b>           | Specifies that a cable interface line card should fragment DOCSIS frames on an upstream when the frame exceeds a particular size.                                                        |
|                  | <b>cable upstream fragmentation</b>            | Enables fragmentation of DOCSIS frames on a particular upstream.                                                                                                                         |
|                  | <b>cable upstream freq-adjust</b>              | Specifies the percentage of frequency adjustment packets that is required to change the adjustment method from the regular power-adjustment method to the noise power-adjustment method. |
|                  | <b>cable upstream max-codes-per-subframe</b>   | Specifies the upper limit to override the maximum value of codes-per-subframe defined in the individual modulation profile setting of an upstream channel.                               |
|                  | <b>cable upstream max-interleave-step</b>      | Specifies the upper limit to override the maximum interleave step for each burst defined in the modulation profile for the upstream channel.                                             |
|                  | <b>cable upstream modulation-profile</b>       | Assigns up to three modulation profiles to an upstream port.                                                                                                                             |
|                  | <b>cable upstream power-adjust</b>             | Controls power-adjustment methods on the Cisco CMTS.                                                                                                                                     |
|                  | <b>cable upstream range-backoff</b>            | Specifies automatic or configured initial ranging backoff calculation.                                                                                                                   |
|                  | <b>cable upstream rate-adapt</b>               | Enables and configures upstream utilization optimization.                                                                                                                                |
|                  | <b>cable upstream rate-limit</b>               | Specifies DOCSIS rate limiting for an upstream port on a cable interface line card.                                                                                                      |
|                  | <b>cable upstream scheduling type</b>          | Enables various scheduler modes.                                                                                                                                                         |
|                  | <b>cable upstream scrambler</b>                | Enables the cable upstream scrambler.                                                                                                                                                    |
|                  | <b>cable upstream shutdown</b>                 | Disables the upstream port.                                                                                                                                                              |
|                  | <b>cable upstream spreading-interval</b>       | Specifies the spreading interval for S-CDMA on an upstream channel.                                                                                                                      |
|                  | <b>cable upstream threshold</b>                | Configures the upstream for the CNR or SNR and FEC threshold values to be used in determining the allowable noise levels.                                                                |
|                  | <b>cable upstream unfrag-slot-jitter</b>       | Specifies how much jitter can be tolerated on the corresponding upstream due to unfragmentable slots.                                                                                    |

# cable upstream max-ports

To configure the maximum number of upstreams on a MAC domain on a cable interface line card, use the **cable upstream max-ports** command in cable interface configuration mode. To reset the card to its default value of 4 upstreams per MAC domain, use the **no** form of this command.

**cable upstream max-ports** *n*

**no cable upstream max-ports**

## Syntax Description

*n* The valid range is 0 to 8, with a default of 4.

## Command Default

4

## Command Modes

Interface configuration (cable interface only)

## Command Modes

| Release     | Modification                                                                            |
|-------------|-----------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced to support the Cisco uBR-MC5X20S cable interface line card. |
| 12.2(15)BC2 | Support was added for the Cisco uBR-MC5X20U cable interface line card.                  |
| 12.2(33)SCE | The minimum number of max-ports supported was changed from 1 to 0.                      |

## Usage Guidelines

Use this command to specify how many upstreams a MAC domain will support on the cable interface line card, before using the **cable upstream connector** command to assign upstreams to physical ports on the card. The MAC domains on a card can be configured for different maximum upstream values.

After using this command, the valid range for upstreams on that cable interface will be from 0 to one less than the maximum port value. For example, if you use the **cable upstream max-ports 6** command to specify a maximum of 6 upstreams for the MAC domain, the valid range for upstreams will be 0 to 5.

The total of max-ports on each interface should not be greater than the total number of upstream channels in the line card. For example, the Cisco uBR-MC3GX60V line card that has a total of 60 upstream channels can have a maximum of 60 max-ports and the Cisco UBR-MC20X20V line card that has a total of 20 upstream channels can have a maximum of 20 max-ports.

If the max-port exceeds the number of upstream channels on a line card, the total number of ports that can be unshut is limited to the actual number of channels available on the line card and the remaining ports remain as shutdown.

The **cable upstream connector** command fails when all the upstream channels are mapped. For example, with Cisco uBR-MC3GX60V line card, if 60 upstream ports are mapped to connectors, adding more upstream ports to connectors fail. When you configure a total of 120 ports and unshut the first 60 ports but map the last 60 ports to connectors, none of the ports work because the port is either shutdown or has no connector mapped to it.

Examples

The following example shows how to configure all MAC domains on a Cisco uBR-MC5X20S card for a maximum number of 6 upstreams.

```
Router# configure terminal
Router(config)# interface cable c6/1/0
Router(config-if)# cable upstream max-ports 1
Router(config-if)# interface cable c6/1/1
Router(config-if)# cable upstream max-ports 2
Router(config-if)# interface cable c6/1/2
Router(config-if)# cable upstream max-ports 3
Router(config-if)# interface cable c6/1/3
Router(config-if)# cable upstream max-ports 6
Router(config-if)# interface cable c6/1/4
Router(config-if)# cable upstream max-ports 8
Router(config-if)# exit
Router(config)# exit
Router#
```

Related Commands

| Command                         | Description                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>cable upstream connector</b> | Maps an upstream port to a physical port on the cable interface line card for use with a particular downstream. |



# cable upstream minislots-size

To specify the minislots size (in ticks) for a specific upstream interface, use the **cable upstream minislots-size** command in cable interface configuration mode. To reset the minislots size to the default for the current channel width setting, use the **no** form of this command.

**cable upstream *n* minislots-size *size***

**no cable upstream *n* minislots-size**

| Syntax Description | <i>n</i>    | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>size</i> | Specifies the minislots size in time ticks. Valid minislots sizes are: <ul style="list-style-type: none"> <li><b>1</b>—(32 symbols at 6.4MHz channel width) Supported by the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X and Cisco uBR-MC5X20S/U cable interface line cards when operating in Advanced TDMA (A-TDMA) DOCSIS 2.0 only mode.</li> <li><b>2</b> (32 symbols at at 3.2 MHz channel width)</li> <li><b>4</b> (64 symbols at 3.2 MHz channel width)</li> <li><b>8</b> (128 symbols at 3.2 MHz channel width)</li> <li><b>16</b> (256 symbols at 3.2 MHz channel width)</li> <li><b>32</b> (512 symbols at 3.2 MHz channel width)</li> <li><b>64</b> (1024 symbols at 3.2 MHz channel width)</li> <li><b>128</b> (2048 symbols at 3.2 MHz channel width)</li> </ul> |

| Command Default | The default settings vary, depending on the upstream's channel width. The default values were changed in Cisco IOS Release 12.2(15)BC1 and later releases to better optimize data and voice traffic on the upstream. <a href="#">Table 23 on page 692</a> lists the default minislots values for each channel width for Cisco IOS releases before and after Cisco IOS Release 12.2(15)BC1. |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Command Modes | Interface configuration (cable interface only) |
|---------------|------------------------------------------------|
|---------------|------------------------------------------------|

| Command History | Release    | Modification                                                                                                                                                                                        |
|-----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3(6) NA | This command was introduced.                                                                                                                                                                        |
|                 | 12.2(15)CX | Support was added for the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line cards, including support for minislots size of 1 to support DOCSIS 2.0 A-TDMA and mixed modulation profiles. |

| Release     | Modification                                                                                                                                                                                                                                                                                          |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | The default minislot size was reduced to optimize the upstream for data and Voice-over-IP (VoIP) traffic. The previous defaults produced 16 bytes per minislot when using QPSK modulation and a 1.6 MHz channel width, and the new defaults produce 8 bytes per minislot with the same configuration. |
| 12.2(15)BC2 | Support was added for the minislot size of 1 to support DOCSIS 2.0 A-TDMA and mixed modulation profiles on the Cisco uBR-MC5X20S/U cable interface line cards.                                                                                                                                        |

### Usage Guidelines

The minislot size determines the minimum amount of information that can be transmitted on the upstream. How much a particular minislot size can contain depends on the modulation profile and channel width being used, with higher-bandwidth settings allowing larger amounts of data.

Because DOCSIS specifications require that the minislot size contain at least 32 symbols, you might need to change the minislot size whenever you change the channel width or modulation of an upstream, to meet the DOCSIS requirements.



#### Note

In Cisco IOS Release 12.2(15)CX, Cisco IOS Release 12.2(15)BC2, and later releases, manually changing the minislot size is not needed on the Cisco uBR-MC16U/X, Cisco uBR-MC28C, and Cisco uBR-MC28U/X cards, because these cards automatically change the minislot size when the channel width is changed, to produce 32 symbols per minislot, as required by the DOCSIS specifications.

Table 23 lists the default minislot sizes for each channel width for Cisco IOS releases before and after Cisco IOS Release 12.2(15)BC1.

**Table 23** Default Minislot Sizes

| Releases Earlier than Cisco IOS Release 12.2(15)BC1 (creates 64 symbols and 16 bytes per minislot) |                                  | Cisco IOS Release 12.2(15)BC1 and Later Releases (creates 32 symbols and 8 bytes per minislot) |                                  |
|----------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------|----------------------------------|
| Channel Width                                                                                      | Default Minislot Size (in Ticks) | Channel Width                                                                                  | Default Minislot Size (in Ticks) |
| 0.2 MHz                                                                                            | 64                               | 0.2 MHz                                                                                        | 32                               |
| 0.4 MHz                                                                                            | 32                               | 0.4 MHz                                                                                        | 16                               |
| 0.8 MHz                                                                                            | 16                               | 0.8 MHz                                                                                        | 8                                |
| 1.6 MHz                                                                                            | 8                                | 1.6 MHz                                                                                        | 4                                |
| 3.2 MHz                                                                                            | 4                                | 3.2 MHz                                                                                        | 2                                |
|                                                                                                    |                                  | 6.4 MHz (DOCSIS 2.0 only)                                                                      | 1 <sup>1</sup>                   |

1. You must be using a 6.4 MHz channel width if using a minislot size of 1 tick. Otherwise, you will violate the DOCSIS requirements that each minislot should contain 32 symbols.

### Increasing the Minislot Size for High Bandwidth Users

The DOCSIS specifications allow a maximum burst limit of 255 minislots, which could require increasing the minislot size from the default values if you are offering service level agreements (SLAs) that offer guaranteed upstream speeds of 2 Mbps or greater, or if you are allowing maximum concatenation bursts greater than 2000 bytes. This is because the default minislot sizes might not accommodate the largest bursts that are possible with these configurations.

The default minislot sizes provide for 8 or 16 bytes per minislot, depending on Cisco IOS release. If the default setting provides 8 bytes per minislot, then the maximum possible burst is 8 bytes \* 255 minislots, or 2040 total bytes, which might not be sufficient for certain users with high guaranteed upstream speeds. You should increase the minislot size to accommodate the expected maximum burst transmissions, adding in approximately 10 percent for overhead.



#### Caution

Using values of 64 or 128 for higher symbol rates such as 1280 kilosymbols/second or 2560 kilosymbols/second can cause performance problems. Depending on your current setting's symbol rate, you should select the minislot size (in ticks) that yields a minislot size of 32 or 64 symbols.

### Examples

The following example shows how to set the minislot size on upstream port 4 to 16:

```
Router# configure terminal
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 4 minislot-size 16
Router(config-if)# exit
Router(config)# exit
Router#
```

### Related Commands

|                                                |                                                                                    |
|------------------------------------------------|------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>                | Defines a modulation profile for use on the router.                                |
| <b>cable upstream channel-width</b>            | Specifies an upstream channel width for an upstream port.                          |
| <b>cable upstream docsis-mode</b>              | Configures an upstream to use either DOCSIS 1.x or DOCSIS 2.0 modulation profiles. |
| <b>cable upstream equalization-coefficient</b> | Enables the use of a DOCSIS 1.1 pre-equalization coefficient on an upstream.       |
| <b>cable upstream modulation-profile</b>       | Assigns one or two modulation profiles to an upstream port.                        |
| <b>show cable hop</b>                          | Displays CM configuration settings.                                                |
| <b>show cable modulation-profile</b>           | Displays the modulation profile information for a Cisco CMTS.                      |
| <b>show interface cable mac-schedule</b>       | Displays the current time-slot scheduling state and statistics.                    |
| <b>show interface cable sid</b>                | Displays cable interface information.                                              |

# cable upstream modulation-profile

To assign up to three modulation profiles to an upstream port, use the **cable upstream modulation-profile** command in cable interface configuration mode. To set the upstream modulation profile to the single default profile based on the DOCSIS-mode setting of the upstream, use the **no** form of this command.

**cable upstream *n* modulation-profile *primary-profile-number* [*secondary-profile-number* [*tertiary-profile-number*]**

**no cable upstream *n* modulation-profile *primary-profile-number* [*secondary-profile-number* [*tertiary-profile-number*]**

| Syntax Description              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                        | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>primary-profile-number</i>   | <p>Specifies the number identifying the primary modulation profile for the upstream port. The primary modulation profile is used when the upstream is operating with nominal noise conditions. The valid values depend on the cable interface being used and the mode of operation.</p> <p>See <a href="#">Table 24</a> for a list of valid ranges according to cable interface and modulation type.</p>                                                                                                                |
| <i>secondary-profile-number</i> | <p>(Optional) Specifies the secondary modulation profile for the upstream port, which is used when noise on the upstream increases to the point that the primary modulation profile can no longer be used. The valid values are the same ranges as the primary modulation profile.</p> <p>The secondary modulation profile should specify a more robust performance profile (in terms of coping with noise) than the primary profile. The secondary profile is used for both basic and advanced dynamic modulation.</p> |
| <i>tertiary-profile-number</i>  | <p>(Optional) Specifies the tertiary modulation profile for the upstream port, which is used when noise on the upstream increases to the point that the secondary modulation profile can no longer be used.</p> <p>The tertiary modulation profile is only available for the basic dynamic modulation. You cannot use the tertiary modulation profile when a spectrum group is defined for the upstream.</p>                                                                                                            |

|                        |                                                                                                                                                                                                                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | Default modulation profiles are created, using profile numbers 1, 21, 41, 101, 121, 201, 221, 241, 321, and 381 depending on the DOCSIS mode and the cable interface line cards being used. See <a href="#">Table 24</a> for a list of the valid ranges for the individual cable interface cards. |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

| Command History | Release                   | Modification                                                                                                                                                                              |
|-----------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA                   | This command was first introduced.                                                                                                                                                        |
|                 | 12.0(7)XR2 and 12.1(1a)T1 | This command was introduced into the Cisco IOS Release 12.0 and Release 12.1 trains, replacing the previous version of the <b>cable upstream modulation-profile</b> command.              |
|                 | 12.1(3a)EC1               | This command was modified to add the optional <i>secondary-profile-number</i> parameter to enable the Dynamic Upstream Modulation feature.                                                |
|                 | 12.1(5)EC                 | This command was introduced for the Cisco uBR7100 series universal broadband routers.                                                                                                     |
|                 | 12.1(7)CX1                | This command was enhanced for the Cisco uBR-MC16S line card.                                                                                                                              |
|                 | 12.2(4)BC1                | Support for this command was added for the Cisco IOS Release 12.2 BC train.                                                                                                               |
|                 | 12.2(8)BC2                | Support for this command was added for the Cisco uBR-MC16S and Cisco uBR-LCP2-MC16S line cards.                                                                                           |
|                 | 12.2(11)CY, 12.2(11)BC3   | Support was added for the Cisco uBR10-MC5X20S cable interface line card on the Cisco uBR10012 router.                                                                                     |
|                 | 12.2(15)CX                | Support was added for the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line card, including DOCSIS 2.0 ATDMA and mixed modulation profiles.                                    |
|                 | 12.2(15)BC2               | Support was added for DOCSIS 2.0 ATDMA and mixed modulation profiles on the Cisco uBR-MC5X20S/U/H cable interface line cards.                                                             |
|                 | 12.2(33)SCA               | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                           |
|                 | 12.3(23)BC7               | This command was modified to add the optional <i>tertiary-profile-number</i> parameter to enable Three Step Dynamic Upstream Modulation feature.                                          |
|                 | 12.2(33)SCC               | Support was added for DOCSIS 2.0 S-CDMA and DOCSIS 3.0 S-CDMA modulation profiles using 1.6 MHz, 3.2 MHz, and 6.4 MHz channel widths on the Cisco UBR-MC20X20V cable interface line card. |

## Usage Guidelines

The **cable upstream modulation-profile** command assigns up to three modulation profiles to an upstream port, depending on the type of cable interface and Cisco IOS software release being used. The third modulation profile is only available for the basic dynamic modulation and is unavailable when a spectrum group is defined for the upstream.

### Static Modulation Profile (single profile)

The **cable upstream modulation-profile** command assigns a single modulation profile to an upstream port on the Cisco uBR7100 series routers and on all cable interface line cards that are available for the Cisco CMTS routers. This modulation profile affects all CMs and set-top boxes that are using that upstream port.

### Dynamic Upstream Modulation (up to three profiles)

The **cable upstream modulation-profile** command assigns up to three modulation profiles to an upstream port to use the Dynamic Upstream Modulation feature. You must assign at least two profiles to activate the Dynamic Upstream Modulation feature. This feature operates differently, depending on the Cisco IOS software release and the cable interface line card that is providing the upstream port:

- The upstream port is on a Cisco uBR7100 series router or on a Cisco uBR-MC28U/X, or Cisco uBR-MC16U/X line card that is used on Cisco CMTS router running Cisco IOS Release 12.3(23)BC7 or later release.

When using the Dynamic Upstream Modulation feature, the primary modulation profile is the default profile. The line card monitors the signal-to-noise ratio (SNR) value and forward error correction (FEC) counters for the upstream, to track the upstream signal quality. For a dual modulation profile, the line card monitors the SNR value, carrier-to-noise ratio (CNR) value, and FEC counters to track the upstream signal quality.

When the noise on the upstream exceeds the threshold(s) for the primary profile, the upstream switches to the secondary profile in a dual modulation profile. Whereas, in a three modulation profile setup, the upstream can switch from primary profile to the secondary profile or directly to the tertiary profile based on the SNR, and FEC counter thresholds. Two separate thresholds are used for switching between the primary profile and the secondary profile and from secondary profile to the tertiary profile.

When the noise conditions improve (defined as a SNR value that is 3 dB greater than the threshold value and FEC counters that are below the threshold values), the upstream automatically switches back to the primary modulation profile. For a Three Step Dynamic Upstream Modulation, the user can configure the threshold values and FEC counters for the upgrade. However, there is no direct upgrade from tertiary profile to the primary profile. The upgrade follows a sequential order, from tertiary profile to secondary profile and then to the primary profile.

For example, in a dual modulation profile, the primary modulation profile could be configured for 16-QAM (or mixed 16-QAM and QPSK) operation and the secondary profile for QPSK operation. If noise conditions on the upstream threaten to force CMs offline, the upstream switches to the secondary profile to implement QPSK operation. When the noise ingress conditions are solved, the upstream switches back to 16-QAM operation.

In a Three Step Dynamic Upstream Modulation, the primary modulation profile could be configured for 64-QAM operation, the secondary modulation profile for 16-QAM operation (or mixed 64-QAM and 16-QAM), and the tertiary modulation profile for QPSK. If the noise conditions increase, the upstream switches to the secondary profile to implement 16-QAM (or mixed profile) operation and then to the tertiary modulation profile to implement QPSK operation. When the noise ingress conditions are improved, the upstream switches back to 16-QAM operation (or mixed 64-QAM and 16-QAM), and then to the 64-QAM operation, on further improvement of noise conditions.



**Note** For more information on this form of the Dynamic Upstream Modulation feature, see the chapter, *Spectrum Management for the Cisco Cable Modem Termination System*, in the *Cisco CMTS Feature Guide*.

When Dynamic Upstream Modulation is enabled and spectrum groups are configured on the same interface, the line cards respond to excessive noise by first switching to the secondary modulation profile. If the noise conditions worsen, the line card changes the modulation or frequency hopping in an attempt to find a new upstream channel, and if that fails, the line card reduces the channel width.



**Note** The default priority of switching modulation profile is frequency (F), modulation (M), and channel-width (C). However, it is user configurable and can be changed to MFC or FCM.

- The upstream port is on a Cisco uBR-MC16U/X line card that is used on Cisco CMTS routers using Cisco IOS Release 12.1(7)CX1 or later release, or on a Cisco uBR-MC5X20S/U/H line card.

The Dynamic Upstream Modulation feature on the Cisco uBR-MC16U/X line card is identical to other line cards except that the spectrum management hardware onboard the Cisco uBR-MC16U/X or Cisco uBR-MC5X20S/U/H line card uses the CNR value (you can use only the CNR value for a dual profile configuration) in conjunction with the SNR value. The CNR value is a more accurate description of noise conditions on the upstream. Because of this, these line cards switch back to the primary modulation profile when noise conditions improve to a CNR value that is only 3 dB greater than the threshold value (assuming FEC counters are also below the threshold values).



**Note** If the Cisco CMTS router is running Cisco IOS Release 12.1(3a)EC1 or a later Cisco IOS release, the Dynamic Upstream Modulation feature on the Cisco uBR-MC16U/X line card operates the same as it does on the other line cards.

When Dynamic Upstream Modulation is enabled and spectrum groups are configured on the same interface, the line cards take corrective action in response to excessive noise, as determined by the **cable upstream hop-priority** command (either frequency hopping or changing to the secondary modulation profile). If the noise conditions worsen, the line card takes the second corrective action that has been defined, and if that fails, the line card takes the last corrective action.



**Note**

The Dynamic Upstream Modulation feature uses the SNR, CNR, and FEC thresholds for 64-QAM, 16-QAM, and QPSK operation to determine when to switch modulation profiles. We recommend the use of 64-QAM, 16-QAM, and QPSK for primary, secondary, and tertiary profiles in a Three Step Dynamic Upstream Modulation.

For dual profile configuration, we recommend the use of 16-QAM or mixed 16-QAM and QPSK modulation for primary profile and QPSK modulation for the secondary profile. However, this is optional. Both modulation profiles can be either QPSK or QAM. It is not mandatory that one is QAM and the other QPSK, but modulation profile switchover is tied to the QAM and QPSK thresholds.



**Tip**

Modulation profiles must be first created using the **cable modulation-profile** command before they can be assigned using the **cable upstream modulation-profile** command.

### Modulation Profile Ranges

The valid range for modulation profiles depends on the cable interface used and the type of modulation profile created.

Table 24 lists the valid ranges according to cable interface and modulation type.

**Table 24 Supported Channel Widths and DOCSIS Modes for Cable Interfaces**

| Cable Interface                                       | DOCSIS 1.X (TDMA)        | Mixed DOCSIS 1.X/2.0        | DOCSIS 2.0 (A-TDMA)         | DOCSIS 3.0 (S-CDMA)       |
|-------------------------------------------------------|--------------------------|-----------------------------|-----------------------------|---------------------------|
| Cisco uBR-MC16U/X <sup>1</sup> ,<br>Cisco uBR-MC28U/X | 41 to 50 (default is 41) | 141 to 150 (default is 141) | 241 to 250 (default is 241) | N/A                       |
| Cisco uBR10-MC5X20S/U/H                               | 21 to 30 (default is 21) | 121 to 130 (default is 121) | 221 to 230 (default is 221) | N/A                       |
| Cisco UBR-MC20X20V <sup>2</sup>                       | 21 to 30 (default is 21) | 121 to 130 (default is 121) | 221 to 230 (default is 221) | 1 to 400 (default is 381) |

1. Supports 6,400,000 Hz (5,120,000) symbols/sec) while operating in DOCSIS 2.0 (A-TDMA-only) mode.

- The UBR-MC20X20V cable interface line card has three variants, UBR-MC20X20V-0D, UBR-MC20X20V-5D, and UBR-MC20X20V-20D. The UBR-MC20X20V-0D line card supports 20 upstreams and zero (no) downstreams. The UBR-MC20X20V-5D line card supports 20 upstreams and five downstreams, and the UBR-MC20X20V-20D line card supports 20 upstreams and 20 downstreams.

In addition to the legacy modulation profile number schemes, the new global modulation profile scheme introduced in Cisco IOS Release 12.2(33)SCC, allows you to assign any modulation profile number to any DOCSIS-mode up to 400, without any restrictions.

The global modulation profile mode allows you to create and configure DOCSIS 3.0 channel type 4SR (**scdma-d3**). When an upstream's DOCSIS mode is changed into scdma-d3, it is initially assigned to the system created default modulation profile as shown in [Table 24](#).

**Note**

Though you can assign any number between 1 to 400 to any modulation profile, the default modulation profile number assigned to an upstream channel for a given channel type will remain the same. That is, modulation profile numbers 21, 121, 221, 321, and 381 will be applicable for TDMA, mixed, A-TDMA, S-CDMA, and DOCSIS 3.0 S-CDMA channel types.

All the existing and previously defined modulation profiles are converted to the new format. However, all the newly created modulation profiles, which are outside of the legacy number space range, will be lost when you revert to the legacy modulation profile.

For more details on the new global modulation profile scheme, refer to the **cable modulation-profile global-scheme** command.

**Examples**

The following example assigns the primary modulation profile 2, the secondary modulation profile 1, and the tertiary modulation profile 4 to the upstream port 0 on the cable interface line card in slot 3. This automatically enables the Dynamic Upstream Modulation feature for all CMs using that upstream.

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 0 modulation-profile 2 1 4
Router(config-if)#
```

The following example assigns the primary modulation profile 2 and the secondary modulation profile 1, to the upstream port 0 on the cable interface line card in slot 3. This automatically enables the Dynamic Upstream Modulation feature for all CMs using that upstream.

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 0 modulation-profile 2 1
Router(config-if)#
```

**Related Commands**

| Command                                       | Description                                                |
|-----------------------------------------------|------------------------------------------------------------|
| <b>cable modulation-profile</b>               | Creates a cable modulation profile.                        |
| <b>cable modulation-profile global-scheme</b> | Defines a global modulation profile for use on the router. |



| Command                              | Description                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable upstream hop-priority</b>   | Determines the order of the corrective actions to be taken when ingress noise exceeds the allowable value for an upstream.<br><br>This command is related to the <b>cable upstream modulation-profile</b> command only when using advanced dynamic modulation configuration, that is, when spectrum group is defined for the upstream channel. |
| <b>show cable modulation-profile</b> | Displays the cable modulation profiles that have been created.                                                                                                                                                                                                                                                                                 |

# cable upstream power-adjust

To control power-adjustment methods on the Cisco CMTS, use the **cable upstream power-adjust** command in cable interface configuration mode. To return to the default values, use the **no** form of this command.

**cable upstream *n* power-adjust {continue *pwr-level* | noise *perc-pwr-adj* | threshold *value*}**

**no cable upstream *n* power-adjust {continue | noise | threshold}**

## Syntax Description

|                                  |                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                         | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                                                                                             |
| <b>continue</b> <i>pwr-level</i> | Specifies the power threshold value that determines the value of the Ranging Status field in the Ranging Response (RNG-RSP) messages that the CMTS sends to the CM. The valid range is from 2 to 15 dB, with a default of 4 dB.                                                                                                         |
| <b>threshold</b> <i>value</i>    | Specifies the power adjustment threshold. The threshold range is from 0 to 10 dB, with a default of 1 dB.                                                                                                                                                                                                                               |
| <b>noise</b> <i>perc-pwr-adj</i> | Specifies the percentage of power adjustment packets that is required to change the adjustment method from the regular power-adjustment method to the noise power-adjustment method, which uses an averaging algorithm to smooth out wide jumps in the power level. The valid range is 10 to 100 percent, with a default of 30 percent. |

## Command Default

The **continue** option defaults to 4 dB, the **noise** option defaults to 30 percent, and the **threshold** option defaults to 1 dB.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release  | Modification                 |
|----------|------------------------------|
| 12.0(7)T | This command was introduced. |

## Usage Guidelines

When a CM comes online, it sets itself for the optimal power level, as determined by the CMTS. As the CMTS periodically polls each CM, the CMTS examines the CM's power level and orders the CM to adjust its power level to adapt to current total attenuation between it and the CMTS. These power adjustments can be required because of temperature variations, upstream frequency hopping, or increased attenuation that has been added either intentionally or unintentionally. The **cable upstream power-adjust** command controls how the CMTS makes these power adjustments.



### Note

To set the upstream power level on the CMTS, see [cable upstream power-level, page 704](#).

### Setting the threshold Option

The **threshold** option specifies the allowable range between the target upstream power for a CM and the actual receive power that the CMTS is measuring for that CM. If the CM receive power level is above or below the target power level by a value that is greater than the **threshold** option, the CMTS will command the CM to change its power level. When the CMTS receive power level for a CM falls within the **threshold** range of the target power level, the CMTS stops commanding the CM to change its power level.

For example, the default **threshold** value of 1 dB means that the CM must be 1 dB above or below its target power range before the CMTS will command it to change its power level. If the CM is within 1 dB of its target power level, the CMTS does not adjust the CM's power level.



#### Note

The **threshold** parameter can be set from 0 dB to 10 dB with a default of 1 dB. However, do not set the **threshold** to 0 dB because this means that the CMTS will command all CMs to continually change their power levels until the CMTS measures the power levels at exactly 0 dBmV. Cisco recommends that you set the **threshold** parameter to a minimum of its default value of 1 dB so that the CMs do not change their power levels continually for minuscule RF plant variations.

### Setting the continue Option

The **continue** option specifies the maximum allowable range for the CM's power level, in relation to its target power level. The CM can operate even at its maximum transmit power level, as long as it is within the **continue** range. The **continue** parameter can be set from 2 dB to 15 dB, with a default of 4 dB. For example, with the value of 2 dB, the CM can operate within 2 dB of its target power level, even if it is transmitting at its maximum power level.

The **continue** option works together with the **threshold** option to control the CM's operation. If the CM is within the **threshold** range, the CMTS sets the Ranging Status field of its RNG-RSP messages to SUCCESS. If the CM is outside the **threshold** range, but within the **continue** range, the CMTS sets the Ranging Status field to CONTINUE.



#### Note

Cisco recommends designing the network so that CMs are at least 6 dB from the CM's maximum transmit power level. This will accommodate new services, changing modulation schemes, different channel widths, customer-installed passives, temperature variations, and other non-linearities. DOCSIS specifies a minimal power range of +8 dBmV to +55 dBmV for 16-QAM operation and +8 dBmV to +58 dBmV maximum power level for QPSK operation. Cisco CMs typically have a maximum power level of +60 dBmV, which exceeds the DOCSIS standards.



#### Tip

If a number of CMs are transmitting close to their maximum transmit power, try increasing the **continue** range to allow the CMTS to continue adjusting the CM's power levels. This situation can happen when systems use high value taps, such as 29 dB taps, in the design of the plant.



#### Note

When the CM requires 16 successive power adjustments that are greater than the value of the **continue** option, the CMTS re-initializes the CM and starts to rescan downstream carriers, as per the DOCSIS specification.

### Determining if the CM has Reached Its Maximum Power Level

Per the DOCSIS specification, the CMTS does not adjust the CM power level by commanding the CM to set itself to an absolute power level. Instead, the CMTS changes the CM power levels by commanding the CM to make relative power adjustments, using increments of  $\pm 0.25$  dB (or multiples thereof).

If the CMTS commands a CM to adjust its power level by a particular amount, but the measured power level afterwards shows that the CM has made a smaller adjustment than requested, the **show cable flap-list** and **show cable modem** commands show an exclamation point (!) for that particular CM. This typically indicates that the CM has reached its maximum power level.

If the CM has not reached its maximum power level, but the **show cable flap-list** and **show cable modem** commands still show an exclamation point (!) for that CM, the problem could be a fault in the upstream path of the cable network. This fault is typically found as amplifier misalignment, where one upstream amplifier is adjusted with too much input attenuation, and the next has too little. The amplifier with too little attenuation enters non-linear operation and begins serious intermodulation.

Another possible cause is a faulty CM or a faulty connection between the CM and cable network. For example, a faulty coaxial cable or bad F-connector could also create noise problems.



#### Note

A CM that shows an exclamation point (!) in the **show cable flap-list** and **show cable modem** displays is typically more prone to packet loss than other CMs.

### Setting the noise Option

The **noise** option specifies that when the number of power adjustments beyond the threshold amount exceeds a certain percentage of the total Ranging Requests for a CM, the CMTS switches into its noise power-adjustment method. The noise power-adjustment method uses an averaging algorithm to make power adjustments for a particular CM, so that if a modem is experiencing wide swings in its power levels (known as “bouncing”), the CMTS averages the power levels before sending a power adjustment to the CM. The CMTS returns to the normal power adjust method after receiving ten Ranging Request messages with power adjustments below the threshold value.

For example, the **cable upstream power-adjust noise 30** command instructs the CMTS that when 30 percent (3 out of the last 10) of the Ranging Responses for a particular CM resulted in a power adjustment beyond the threshold level, the CMTS begins using power averaging for that CM to adjust its power level.



#### Tip

The **cable upstream power-adjust noise** command is typically not needed during normal operations, but it can help in certain situations where the cable plant is experiencing ingress noise and other interference that is forcing many CMs to frequently re-range. If the **show cable flap-list** and **show cable modem** commands show a large number of CMs with asterisks (\*), experiment with the **noise** option, so that the CMTS will average its CM power readings before sending any power adjustments to the CMs.



#### Note

When a CM is in power averaging mode, the **show cable flap-list** and **show cable modem** commands shows an asterisk (\*) for that particular CM.

### Examples

The following example shows the commands needed so that the CMTS will begin using the power averaging adjustment method when 50 percent of Ranging Requests result in a power adjustment beyond the threshold level of 2 dB:

```
Router(config)# interface c6/0
Router(config-if)# cable upstream 0 power-adjust threshold 2
Router(config-if)# cable upstream 0 power-adjust noise 50
Router(config-if)#
```

# Related Commands

| Command                           | Description                                                                          |
|-----------------------------------|--------------------------------------------------------------------------------------|
| <b>cable upstream frequency</b>   | Configures a fixed frequency of the upstream RF carrier for an upstream port.        |
| <b>cable upstream power-level</b> | Sets the input power level for the upstream radio frequency (RF) carrier.            |
| <b>show cable flap-list</b>       | Displays a list of CMs that have exceeded the threshold number of power adjustments. |
| <b>show cable modem</b>           | Displays CM configuration settings.                                                  |

# cable upstream power-level

To set the input power level for the upstream radio frequency (RF) carrier in decibels per millivolt (dBmV), use the **cable upstream power-level** command in cable interface configuration mode. To restore the default value for this command, use the **no** form of this command.

**cable upstream *n* power-level *dbmv***

**no cable upstream *n* power-level *dbmv***

|                           |             |                                                                                                                                                                                                 |
|---------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i>    | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                     |
|                           | <i>dbmv</i> | Decibels per millivolt designating the upstream signal input power level. Valid range is –16 dBmV to +26 dBmV, depending on the cable interface and the upstream's symbol rate (channel width). |

**Command Default** 0 dBmV

**Command Modes** Interface configuration (cable interface only)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                 |
|------------------------|----------------|-----------------------------------------------------------------------------------------------------|
|                        | 11.3 XA        | This command was introduced.                                                                        |
|                        | 12.2(15)BC1    | The allowable range of power levels was changed so that it depends on the upstream's channel width. |

**Usage Guidelines** The Cisco CMTS controls the output power levels of the CMs to meet the desired upstream input power level. The nominal input power level for the upstream RF carrier is specified in decibels per millivolt (dBmV). The default setting of 0 dBmV is the optimal setting for the upstream power level.

The valid range for the input power level depends on the data rate, as expressed as the symbol rate and channel width. [Table 25](#) shows the valid power levels for each allowable rate, as given in the DOCSIS specification. Higher (more positive) values cause the CMs to increase their transmit power, achieving a greater carrier-to-noise ratio (CNR).

**Table 25 Allowable DOCSIS Power Levels**

| <b>Symbol Rate (Symbols per second)</b> | <b>Channel Width (Hz)</b> | <b>Allowable Power Range (dBmV)</b> |
|-----------------------------------------|---------------------------|-------------------------------------|
| 160,000                                 | 200,000                   | –16 to +14                          |
| 320,000                                 | 400,000                   | –13 to +17                          |
| 640,000                                 | 800,000                   | –10 to +20                          |
| 1,280,000                               | 1,600,000                 | –7 to +23                           |

**Table 25** Allowable DOCSIS Power Levels

| Symbol Rate (Symbols per second) | Channel Width (Hz) | Allowable Power Range (dBmV)                   |
|----------------------------------|--------------------|------------------------------------------------|
| 2,560,000                        | 3,200,000          | -4 to +26                                      |
| 5,120,000 <sup>1</sup>           | 6,400,000          | -1 to +29 (max. valid value for DOCSIS is +26) |

1. The 5.12 MSymbols/sec symbol rate and 6.4 MHz channel width are supported only on upstreams that are configured for DOCSIS 2.0 A-TDMA-only operation.

**Note**

Some cable interfaces might allow smaller ranges of either -10 to +10 or -10 to +25 dBmV.

**Tip**

You can use inline attenuators to force CMs to transmit at higher power levels and to achieve a higher CNR value on the network.

**Caution**

If you increase the input power level or add inline attenuators before the CMTS, the CMs on your HFC network increase their transmit power level. Be careful if you adjust this parameter. You might violate the upstream return laser design parameters or exceed the CM's maximum transmit power level.

**Note**

Do not adjust your input power level by more than 5 dB in a 30-second interval. If you *increase* the power level by more than 5 dB within 30 seconds, you will disrupt CM service on your network. If you *decrease* the power level by more than 5 dB within 30 seconds, the CMs on your network will be forced to re-range.

**Tip**

When setting upstream power levels, Cisco recommends that the adjacent channels of equal bandwidth not have a large variation. The recommended maximum input power variance is 5 to 6 dB.

**Examples**

The following example shows how to set the input power level for upstream port 0 to -5 dBmV:

```
Router(config)# interface cable 5/1/0
Router(config-if)# cable upstream 0 power-level -5
Router(config-if)#
```

**Related Commands**

| Command                            | Description                                                                                               |
|------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>cable upstream fec</b>          | Enables the upstream FEC.                                                                                 |
| <b>cable upstream frequency</b>    | Enters a fixed frequency of the upstream RF carrier for an upstream port.                                 |
| <b>cable upstream power-adjust</b> | Controls how the CMTS adjusts the CM power level so that the CMs reach the target transmit power setting. |
| <b>cable upstream shutdown</b>     | Disables the upstream port.                                                                               |

# cable upstream qos wfq

To configure weighted fair queuing (WFQ) parameters for optimum bandwidth utilization for upstream service flows on a cable interface, use the **cable upstream qos wfq** command in cable interface configuration mode. To disable this configuration, use the **no** form of this command.

**cable upstream qos wfq** { **class** | **activity** | **weights** *priority0-priority7* }

**no cable upstream qos wfq** { **class** | **activity** | **weights** *priority0-priority7* }

## Syntax Description

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>class</b>                                 | Enables class-based weighted fair queuing.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>activity</b>                              | Enables activity-based weighted fair queuing.                                                                                                                                                                                                                                                                                                                                                                                |
| <b>weights</b><br><i>priority0-priority7</i> | Specifies custom weight values for all the eight service flow priorities in a service class. By default, the weight of a priority is equal to “priority+1.” For example, priority 0 has a weight of 1 and priority 1 has a weight of 2.<br><br>You must specify custom weight values for all the eight service flow priorities (0 to 7) when you modify the default weights of priorities. The valid range is from 1 to 255. |

## Command Default

None

## Command Modes

Cable interface configuration (config-if)

## Command History

| Release      | Modification                                                   |
|--------------|----------------------------------------------------------------|
| 12.2(33)SCD2 | This command was introduced in Cisco IOS Release 12.2(33)SCD2. |

## Examples

The following example shows how to configure WFQ parameters on a cable interface in slot 7, subslot 1, and port 0 on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable 7/1/0
Router(config-if)# cable upstream qos wfq class
Router(config-if)# cable upstream qos wfq activity
Router(config-if)# cable upstream qos wfq weights 10 20 30 40 50 60 70 80
```

## Related Commands

| Command                                   | Description                                                                                            |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>show interface cable mac-scheduler</b> | Displays the current scheduling state, statistics, and WFQ parameters configured on a cable interface. |



# cable upstream range-backoff

To specify automatic or configured initial ranging backoff calculation, use the **cable upstream range-backoff** command in cable interface configuration mode. To set default values, use the **no** form of this command.

**cable upstream *n* range-backoff {automatic | start end}**

**no cable upstream *n* range-backoff**

## Syntax Description

|                  |                                                                                                                                                                                                                                          |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>         | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                              |
| <b>automatic</b> | Specifies the fixed data backoff start and end values.<br><br><b>Note</b> The <b>automatic</b> setting is not supported on Cisco uBR-MC5X20S/U cable interface line cards, which should use manually configured ranging backoff instead. |
| <i>start</i>     | Binary exponential algorithm. Sets the start value for initial ranging backoff. Valid values are from 0 to 15.                                                                                                                           |
| <i>end</i>       | Binary exponential algorithm. Sets the end value for initial ranging backoff. Valid values are from 0 to 15.                                                                                                                             |

## Command Default

Ranging backoff is enabled with the **automatic** setting

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release | Modification                 |
|---------|------------------------------|
| 12.1 T  | This command was introduced. |

## Usage Guidelines

The DOCSIS-specified method of contention resolution for CMs used to send data or requests on the upstream channel is a truncated binary exponential back-off with the initial backoff window and the maximum backoff window controlled by the CMTS. The Cisco CMTS router specifies backoff window values for both data and initial ranging and sends these values downstream as part of the Bandwidth Allocation Map (MAP) MAC message. The values are power-of-two values. For example, a value of 4 indicates a window between 0 and 15; a value of 10 indicates a window between 0 and 1023.

The **automatic** setting is optimized for a maximum of 250 CMs per upstream port. Set manual values for data backoff windows only when operating with more than 250 CMs per upstream port. (The **automatic** setting is not supported on Cisco uBR-MC5X20S/U cable interface line cards, which should use manually configured ranging backoff instead.)



### Tip

Use the **show controllers cable upstream** command to display the current Ranging Backoff settings.

Examples

The following example shows how to set the range backoff to **automatic** for upstream port 2:

```
Router(config)# interface cable 4/0
Router(config-if)# cable upstream 2 range-backoff automatic
Router(config-if)#
```

Related Commands

| Command                            | Description                                                                       |
|------------------------------------|-----------------------------------------------------------------------------------|
| <b>cable insertion-interval</b>    | Configures the interval between consecutive initial ranging slots on an upstream. |
| <b>cable upstream data-backoff</b> | Specifies automatic or fixed start and stop values for data backoff.              |

# cable upstream ranging-init-technique

To configure the initial ranging technique for the modem in the Multiple Transmit Channel (MTC) mode, use the **cable upstream ranging-init-technique** command in interface configuration mode. To disable the ranging initialization technique, use the **no** form of this command.

**cable upstream ranging-init-technique { 1-4 }**

**no cable upstream ranging-init-technique**

|                    |     |                                                                                                                                           |
|--------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | 1-4 | Type of ranging.                                                                                                                          |
|                    |     | <ul style="list-style-type: none"><li>• 1—broadcast</li><li>• 2—unicast</li><li>• 3—broadcast or unicast</li><li>• 4—direct use</li></ul> |

|                 |                                   |
|-----------------|-----------------------------------|
| Command Default | The default option is 1—broadcast |
|-----------------|-----------------------------------|

|               |                                     |
|---------------|-------------------------------------|
| Command Modes | Interface configuration (config-if) |
|---------------|-------------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                       |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | <p>The ranging initialization technique is used when the modem transitions from a single channel to the multiple transit channel mode (MTC-mode), for the initial ranging on the newly added channels during registration.</p> <p>Use the default value of 1 for initial ranging.</p> |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                               |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to configure the initial ranging for the modem in the MTC-mode:</p> <pre>Router# configure terminal Router(config)# interface cable 7/0/1 Router(config-if)# cable upstream ranging-init-technique 1</pre> |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                | Description                               |
|------------------|------------------------|-------------------------------------------|
|                  | <b>cable mtc-mode</b>  | Enables the MTC-mode for a MAC interface. |
|                  | <b>interface cable</b> | Specifies a cable interface.              |

# cable upstream ranging-poll

To change the default ranging poll interval (20 seconds) on upstream channels, use the **cable upstream ranging-poll** command in cable interface configuration mode. To disable this configuration, use the **no** form of this command.

**cable upstream ranging-poll** [*interval value* | **t4-multiplier** *timeout\_value*]

**no cable upstream ranging-poll** [*interval value* | **t4-multiplier** *timeout\_value*]

|                    |                                           |                                                                                                                                   |
|--------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>interval</b> <i>value</i>              | (Optional) Specifies the ranging poll interval in milliseconds. Valid values are from 20000 to 30000. The default value is 20000. |
|                    | <b>t4-multiplier</b> <i>timeout_value</i> | (Optional) Specifies T4 timeout multiplier value for the cable modems that are in the MTC mode. The valid range is from 1 to 10.  |

Command Default      None

Command Modes      Interface configuration (config-if)

| Command History | Release     | Modification                                                  |
|-----------------|-------------|---------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Usage Guidelines**

T4 multiplier is the T4 timeout multiplier value for cable modems that are in the MTC mode. The default value is derived from the number of channels in the modem transmit channel set. You can change the default T4 multiplier value using the **cable upstream ranging-poll** command in cable interface configuration mode. For example, DOCSIS 2.0 defines T4 timeout for the modem at 30 seconds. If the T4 multiplier value is equal to one, the cable modem will T4 time out in every 30 seconds. If you change the T4 multiplier to four, then the new T4 timeout value will be 120 seconds (4 x 30 = 120).

In the MTC mode, you can increase the T4 timeout value in order to reduce the router overhead associated with processing of ranging request (RNG-REQ) slots and ranging response (RNG-RSP) messages. If an RNG-RSP message does not contain a T4 timeout multiplier value, then the cable modem uses the default T4 timeout value.



**Note**

We recommend that you do not modify the default ranging poll interval unless required. With the default configuration, a DOCSIS 2.0 cable modem in non-MTC mode performs ranging on one upstream channel every 20 seconds.

---

**Examples**

The following example shows how to change the default ranging poll interval and the T4 timeout multiplier value on a cable interface line card:

```
Router# configure terminal
Router(config)# interface cable 7/1/0
Router(config-if)# cable upstream ranging-poll interval 24000 t4-multiplier 4
```

---

**Related Commands**

| Command               | Description                                                           |
|-----------------------|-----------------------------------------------------------------------|
| <b>cable mtc-mode</b> | Enables the Multiple Transmit Channel mode (MTC) for a MAC interface. |

# cable upstream rate-adapt (global)

To globally enable upstream utilization optimization on all cable modem upstream flows, use the **cable upstream rate-adapt** command in global configuration mode. To disable global upstream utilization optimization, use the **no** form of this command.

**cable upstream rate-adapt** [*local* | *priority value* | *rate number*]

**no cable upstream rate-adapt** [*local* | *priority value* | *rate number*]

|                           |                              |                                                                                                                                                                             |
|---------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>local</b>                 | (Optional) Specifies upstream utilization optimization is enabled on a specific upstream.                                                                                   |
|                           | <b>priority <i>value</i></b> | (Optional) Specifies upstream utilization optimization is enabled if an upstream flow meets or exceeds a defined priority. The valid range is 0–7.                          |
|                           | <b>rate <i>number</i></b>    | (Optional) Specifies upstream utilization optimization is enabled if an upstream flow meets or exceeds the set minimum max-rate of the flow. The valid range is 0–30000000. |

**Command Default** Upstream utilization optimization is globally disabled.

**Command Modes** Global configuration (config)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                |
|------------------------|----------------|--------------------------------------------------------------------------------------------------------------------|
|                        | 12.3(23)BC2    | This command was introduced.                                                                                       |
|                        | 12.2(33)SCB    | This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** If upstream utilization optimization is globally enabled, activated service flows are configured for upstream utilization optimization. The command also turns on local upstream utilization optimization so specific local upstreams can be configured to be rate-adapt enabled. Using the **priority** or **rate** option allows you to restrict upstream utilization optimization to service flows that meet or exceed specified levels for priority or rate.

**Examples** The following example enables upstream utilization optimization globally on all upstream flows.

```
Router(config)# cable upstream rate-adapt
```

**Related Commands**

| Command                                      | Description                                                                               |
|----------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>cable upstream rate-adapt (interface)</b> | Enables and configures upstream utilization optimization locally.                         |
| <b>show cable rate-adapt</b>                 | Displays the global and local upstream utilization optimization configuration parameters. |

# cable upstream rate-adapt (interface)

To enable and configure upstream utilization optimization locally, use the **cable upstream rate-adapt** command in cable interface configuration mode. To disable upstream utilization optimization on the specified upstream flow, use the **no** form of this command.

**cable upstream** *port* **rate-adapt** [**bcs** *slots* | **duration** *milliseconds* | **fcms-off** | **priority** *value* | **rate** *number*]

**no cable upstream** *port* **rate-adapt** [**bcs** *slots* | **duration** *milliseconds* | **fcms-off** | **priority** *value* | **rate** *number*]

## Syntax Description

|                                     |                                                                                                                                                                                                                                                                   |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>port</i>                         | Identifies the specific upstream flow to be optimized and configured.                                                                                                                                                                                             |
| <b>bcs</b> <i>slots</i>             | (Optional) Specifies the number of broadcast contention minislots (BCS). MAPs that have gaps are filled with BCS. You can override the default of 10 with a larger or smaller number using the <b>bcs</b> option. The valid range is 0–80. The default is 10 BCS. |
| <b>duration</b> <i>milliseconds</i> | (Optional) Specifies the length of time, in milliseconds, that a flow rate-adapts. This keyword overrides the default duration. The default is 1. The valid range is 0–2000.                                                                                      |
| <b>fcms-off</b>                     | (Optional) Disables the forced broadcast contention minislot at the end of a filled MAP.                                                                                                                                                                          |
| <b>priority</b> <i>value</i>        | (Optional) Specifies the minimum priority required to enable rate-adapt on a flow. This keyword overrides any globally configured rate-adapt priority. The valid range is 0–7.                                                                                    |
| <b>rate</b> <i>number</i>           | (Optional) Specifies the minimum max-rate required to enable rate-adapt on a flow. This keyword overrides any globally configured rate-adapt rate. The valid range is 0–30000000.                                                                                 |

## Command Default

Upstream utilization optimization is not enabled on a local upstream.

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC2 | This command was introduced.                                                                                       |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

If eligible, local upstream flows can utilize upstream utilization optimization.



---

**Examples**

The following example enables and configures rate-adapt on upstream 0 with a priority of 6 and a rate of 200.

```
Router(config-if)# cable upstream 0 rate-adapt priority 6 rate 200
```

---

**Related Commands**

| Command                                   | Description                                                                               |
|-------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>cable upstream rate-adapt (global)</b> | Enables upstream utilization optimization globally on all cable modem upstream flows.     |
| <b>show cable rate-adapt</b>              | Displays the global and local upstream utilization optimization configuration parameters. |

# cable upstream rate-limit

To set DOCSIS rate limiting for an upstream port on a cable interface line card, use the **cable upstream rate-limit** command in cable interface configuration mode. To disable DOCSIS rate limiting for the upstream port, use the **no** form of this command.

**cable upstream *n* rate-limit [token-bucket [shaping]]**

**no cable upstream *n* rate-limit**

## Syntax Description

|                             |                                                                                                                                                                                |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                    | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                    |
| <b>token-bucket shaping</b> | (Optional) Enables rate limiting for the specified upstream cable interface using the token-bucket policing algorithm. The <b>shaping</b> option enables token-bucket shaping. |

## Command Default

Token-bucket algorithm with traffic shaping

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release   | Modification                                                                      |
|-----------|-----------------------------------------------------------------------------------|
| 11.3(6)NA | This command was introduced for the Cisco uBR7246VXR universal broadband routers. |
| 11.3(9)NA | The <b>shaping</b> keyword was added.                                             |

## Usage Guidelines

Upstream rate limiting allows upstream bandwidth requests from rate-exceeding CMs to be buffered without incurring TCP-related timeouts and retransmits. This enables the Cisco CMTS to enforce the peak upstream rate for each CM without degrading overall TCP performance for the subscriber CPE devices. Upstream grant shaping is per cable modem (SID).

When the **token-bucket** algorithm is configured, the Cisco CMTS automatically drops packets in violation of allowable upstream bandwidth.

Use of the default value (the upstream port's rate limit) enforces strict DOCSIS-compliant rate limiting. Cisco highly recommends to using the default setting of **token-bucket** with the **shaping** option.



### Note

This command is specific to the Cisco uBR7225VXR routers only.

## Examples

The following example shows how to configure the token bucket filter algorithm with traffic shaping on upstream port 4:

```
Router(config-if)# cable upstream 4 rate-limit token-bucket shaping
```

**Related Commands**

| Command                            | Description                                         |
|------------------------------------|-----------------------------------------------------|
| <b>cable downstream rate-limit</b> | Enables DOCSIS rate limiting on downstream traffic. |

# cable upstream rate-limit-bwreq exempted-priority

To configure the service flow priority of the bandwidth requests that should be exempted from being throttled by the upstream (US) bandwidth request rate limiting (BRRL) feature, use the **cable upstream rate-limit-bwreq exempted-priority** command in global configuration mode. To reset the exempted priority to the default value, use the **no** form of this command.

```
cable upstream rate-limit-bwreq exempted-priority priority

no cable upstream rate-limit-bwreq
```

|                    |                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <div> <div>priority</div> <div>Service flow priority.</div> <div>Bandwidth requests with this service flow priority value (and above) are exempted from being throttled by the BRRL feature. For example, if the priority value is set to 3, then bandwidth requests with priority 3, 4, 5, 6, and 7 are exempted. The valid range is from 0 to 7.</div> </div> |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                           |
|-----------------|-----------------------------------------------------------|
| Command Default | All bandwidth requests are throttled by the BRRL feature. |
|-----------------|-----------------------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The upstream BRRL feature throttles incoming bandwidth requests in order to control CPU consumption by the US scheduler.                                                                                                                                                                                                                                                                                                                                                                                    |
|                  | The <b>cable upstream rate-limit-bwreq exempted-priority</b> command enables you to configure an exempted priority. Any best effort(BE) service flow bandwidth requests received with this configured priority or above, is exempted from BRRL and is therefore not dropped even if high CPU consumption by the US scheduler is observed. For example, if the configured exempted priority is 4, any bandwidth request with priority 4, 5, 6, or 7 is not dropped even if high CPU consumption is observed. |
|                  | Exempted service flow priority is a platform level configuration and is applicable to all line cards. If the exempted priority is set to value zero, all the BE bandwidth requests are exempted from being throttled by the BRRL feature.                                                                                                                                                                                                                                                                   |

|          |                                                                                                |
|----------|------------------------------------------------------------------------------------------------|
| Examples | The following example shows how to configure a BRRL exempted service flow priority to value 5: |
|          | Router# <b>configure terminal</b>                                                              |
|          | Router(config)# <b>cable upstream rate-limit-bwreq exempted-priority 5</b>                     |

# cable upstream rate-limit-ccf

To configure rate limiting parameters for upstream bonded service flows on a Cisco uBR10-MC5X20H cable interface line card, use the **cable upstream rate-limit-ccf** command in global configuration mode. To disable this configuration, use the **no** form of this command.

**cable upstream rate-limit-ccf** [**aggregated-burst** *value* | **aggregated-throughput** *value* | **cpu-burst** *value* | **cpu-threshold** *value*]

**no cable upstream rate-limit-ccf** [**aggregated-burst** *value* | **aggregated-throughput** *value* | **cpu-burst** *value* | **cpu-threshold** *value*]

## Syntax Description

|                                           |                                                                                                                                                                                |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>aggregated-burst</b> <i>value</i>      | (Optional) Specifies the burst rate for aggregated throughput-based rate limiting in bits. The valid range is from 0 to 250000000. The default value is 8000000.               |
| <b>aggregated-throughput</b> <i>value</i> | (Optional) Specifies the throughput value for throughput-based rate limiting in bits per second (bps). The valid range is from 0 to 540000000. The default value is 115000000. |
| <b>cpu-burst</b> <i>value</i>             | (Optional) Specifies the CPU burst for Continuous Concatenation and Fragmentation (CCF) in percentage. The valid range is from 0 to 100. The default value is 10.              |
| <b>cpu-threshold</b> <i>value</i>         | (Optional) Specifies the CPU threshold for CCF in percentage. The valid range is from 0 to 100. The default value is 50.                                                       |

## Command Default

None

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                  |
|-------------|---------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

## Examples

The following example shows how to configure rate limiting parameters for upstream bonded service flows on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# cable upstream rate-limit-ccf
Router(config)# cable upstream rate-limit-ccf aggregated-burst 25000
Router(config)# cable upstream rate-limit-ccf aggregated-throughput 540000
Router(config)# cable upstream rate-limit-ccf cpu-burst 30
Router(config)# cable upstream rate-limit-ccf cpu-threshold 60
```

## Related Commands

| Command                              | Description                                                                                                      |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>show cable<br/>rate-limit-ccf</b> | Displays information about rate limiting criteria configured on a Cisco uBR10-MC5X20H cable interface line card. |

# cable upstream resiliency

To configure cable upstream resiliency on a cable interface line card, use the **cable upstream resiliency** command in cable interface configuration mode. To disable the configuration, use the **no** form of this command.

**cable upstream resiliency** { **channel-down-detect** *number* | **modem-offline-detect** *number* | **on-failure** { **disable-channel** | **extended-ranging** | **reset-modem** } | **sf-move RTPS** }

**no cable upstream resiliency** { **channel-down-detect** *number* | **modem-offline-detect** *number* | **on-failure** { **disable-channel** | **extended-ranging** | **reset-modem** } | **sf-move RTPS** }

## Syntax Description

|                                           |                                                                                                                                                                                     |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>channel-down-detect</b> <i>number</i>  | Specifies the threshold (number of consecutive ranging misses) to determine if a channel is down. The valid values are from 8 to 64.                                                |
| <b>modem-offline-detect</b> <i>number</i> | Specifies the threshold (number of consecutive ranging misses) to determine if a CM is offline. The valid values are from 4 to 16.                                                  |
| <b>on-failure</b>                         | Allows you to specify what should be done if the channel is down and the CM is offline.                                                                                             |
| <b>disable-channel</b>                    | Allows the CMTS to mark the channel as unusable when a failure is detected.                                                                                                         |
| <b>extended-ranging</b>                   | Allows the CMTS to continue ranging when a failure is detected.                                                                                                                     |
| <b>reset-modem</b>                        | Enforces the CM to go offline when a failure is detected.                                                                                                                           |
| <b>sf-move</b>                            | Moves the upstream service flows on an impaired upstream channel to another good upstream channel in the transmit channel set of the cable modem without resetting the cable modem. |
| <b>RTPS</b>                               | Moves Real-time Polling Service (RTPS) type service flows.                                                                                                                          |

## Command Default

By default, the threshold to determine if a channel is down is not enabled, the CMTS is set to continue ranging when a failure is detected and the threshold to determine if a CM is offline is set to 8.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                                                          |
|-------------|-----------------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC.         |
| 12.2(33)SCG | This command was modified. The <b>sf-move RTPS</b> keyword was added. |

## Examples

The following example shows how to configure upstream resiliency with different keywords on a cable interface in slot 5, subslot 1, and port 0 on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable 5/1/0
Router(config-if)# cable upstream resiliency channel-down-detect 30
Router(config-if)# cable upstream resiliency modem-offline-detect 16
Router(config-if)# cable upstream resiliency on-failure disable-channel
Router(config-if)# cable upstream resiliency sf-move RTPS
```

The following example shows how to configure RTPS type service flow move on a cable interface in slot 7, subslot 0, and port 0 in Cisco IOS Release 12.2(33)SCG:

```
Router#show run all | i sf-move

no cable upstream resiliency sf-move RTPS

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface cable 7/0/0
Router(config-if)#cable upstream resiliency sf-move RTPS
Router(config-if)#end
Router#

Router#show run interface cable 7/0/0 | i sf-move

cable upstream resiliency sf-move RTPS
Router#
```

**Associated Features** The **cable upstream resiliency** command is used to configure the [Upstream Channel Bonding](#) feature.

| Related Commands | Command         | Description                 |
|------------------|-----------------|-----------------------------|
|                  | interface cable | Configures cable interface. |



# cable upstream rf-adapt

To enable RF adaptation on the physical upstream channel, use the **cable upstream rf-adapt** command in cable interface configuration mode. To disable the RF adaptation, use the **no** form of this command.

**cable upstream port rf-adapt**

**no cable upstream port rf-adapt**

|                           |             |                                                                                                                                                                                                                                 |
|---------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>port</i> | Upstream port number. The valid values start with 0 for the first upstream port on the cable interface line card and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
|---------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                        |                                        |
|------------------------|----------------------------------------|
| <b>Command Default</b> | By default, RF adaptation is disabled. |
|------------------------|----------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCF    | This command was introduced. |

|                         |                                                                                                                                                                                                       |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>cable upstream port rf-adapt</b> command is available only when the maximum number of logical channels configured using the <b>cable upstream max-logical-chans</b> command is greater than 1. |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                   |
|-----------------|-----------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable RF adaptation on cable interface 8/0/0: |
|-----------------|-----------------------------------------------------------------------------------|

```
Router(config)# interface cable 8/0/0
Router(config-if)# cable upstream 0 max-logical-chans 2
Router(config-if)# cable upstream 0 rf-adapt
```

| <b>Related Commands</b> | <b>Command</b>                                   | <b>Description</b>                                                                                                                                                    |
|-------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | <b>cable rf-adapt timer</b>                      | Configures timers for RF adaptation.                                                                                                                                  |
|                         | <b>cable upstream rf-adapt (logical channel)</b> | Configures the primary upstream logical channel and secondary upstream logical channel.                                                                               |
|                         | <b>cable upstream threshold</b>                  | Configures the upstream for the signal-to-noise ratio (SNR) and forward error correction (FEC) threshold values to be used in determining the allowable noise levels. |
|                         | <b>cable upstream threshold hysteresis</b>       | Configures the hysteresis value to be used in conjunction with the dynamic modulation upgrade thresholds.                                                             |

| Command                                  | Description                                                                                                                                                               |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable upstream threshold rf-adapt</b> | Configures the upstream RF adaptation threshold value, which prevents excessive relocation of modems from the primary upstream channel to the secondary upstream channel. |
| <b>show cable modem rf-adapt</b>         | Displays the RF adaptation history.                                                                                                                                       |
| <b>show cable rf-adapt</b>               | Displays the downgrade and upgrade candidate lists.                                                                                                                       |

## cable upstream rf-adapt (logical channel)

To specify the primary upstream logical channel and the secondary upstream logical channel, use the **cable upstream port logical-channel-index rf-adapt [primary | secondary]** command in cable interface configuration mode. To reset to the default settings, use the **no** form of this command.

**cable upstream port logical-channel-index rf-adapt [primary | secondary]**

**no cable upstream port logical-channel-index rf-adapt [primary | secondary]**

|                           |                              |                                                                                                                                                                                                                                  |
|---------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>port</i>                  | Upstream port number. The valid values start with 0 for the first upstream port on the cable interface line card and ends with a value that depends on the number of upstream ports supported by the cable interface line card.. |
|                           | <i>logical-channel-index</i> | Logical channel index. The valid values are 0 or 1.                                                                                                                                                                              |
|                           | <b>primary</b>               | (Optional) Assigns the logical channel as primary for RF adaptation. By default, logical channel 0 is set as primary.                                                                                                            |
|                           | <b>secondary</b>             | (Optional) Assigns the logical channel as secondary for RF adaptation. By default, logical channel 1 is set as secondary.                                                                                                        |

|                        |                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | Uses the default configuration. Logical channel 0 is primary and logical channel 1 is secondary. |
|------------------------|--------------------------------------------------------------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Interface configuration (config-if) |
|----------------------|-------------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCF    | This command was introduced. |

|                         |                                                                                                        |
|-------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | It is recommended that logical channel 0 is set as primary, and logical channel 1 is set as secondary. |
|-------------------------|--------------------------------------------------------------------------------------------------------|

|                 |                                                                                      |
|-----------------|--------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to configure primary and secondary logical channels: |
|-----------------|--------------------------------------------------------------------------------------|

```
Router> enable
Router# configure terminal
Router(config)# interface cable 8/0/0
Router(config-if)# cable upstream 0 max-logical-chans 2
Router(config-if)# cable upstream 0 rf-adapt
Router(config-if)# cable upstream 0 1 rf-adapt primary
Router(config-if)# cable upstream 0 0 rf-adapt secondary
```

| Related Commands | Command                                    | Description                                                                                                                                                               |
|------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable rf-adapt timer</b>                | Configures timers for RF adaptation.                                                                                                                                      |
|                  | <b>cable upstream rf-adapt</b>             | Enables RF adaptation on the physical upstream channel.                                                                                                                   |
|                  | <b>cable upstream threshold</b>            | Configures the upstream for the signal-to-noise ratio (SNR) and forward error correction (FEC) threshold values to be used in determining the allowable noise levels.     |
|                  | <b>cable upstream threshold hysteresis</b> | Configures the hysteresis value to be used in conjunction with the dynamic modulation upgrade thresholds.                                                                 |
|                  | <b>cable upstream threshold rf-adapt</b>   | Configures the upstream RF adaptation threshold value, which prevents excessive relocation of modems from the primary upstream channel to the secondary upstream channel. |
|                  | <b>show cable modem rf-adapt</b>           | Displays the RF adaptation history.                                                                                                                                       |
|                  | <b>show cable rf-adapt</b>                 | Displays the downgrade and upgrade candidate lists.                                                                                                                       |

# cable upstream rng-holdoff

To hold off a cable modem from initial ranging (init rl) on a logical upstream channel on the CMTS router, use the **cable upstream rng-holdoff** command in cable interface configuration mode. To disable the ranging hold-off, use the **no** form of this command.

**cable upstream** *port-number* **rng-holdoff** *priority*

**no cable upstream** *port-number* **rng-holdoff** *priority*

## Syntax Description

|                                    |                                                                                                                                                                                                                                                             |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>port-number</i>                 | Cable upstream port number. The valid range depends on the number of upstream channels configured in a MAC domain. For example, if the total number of upstream channels configured is 4, then the valid range for the upstream port number is from 0 to 3. |
| <b>rng-holdoff</b> <i>priority</i> | Specifies the ranging hold-off priority value in the hexadecimal format. The valid range is from 0 to ffffffff. The default value is 0.                                                                                                                     |

## Command Default

None

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCH | This command was introduced. |

## Usage Guidelines

An upstream channel descriptor (UCD) message includes type, length, value (TLV) 18 and 19 for an upstream logical channel based on the channel class ID and ranging hold-off priority configuration. If a ranging hold-off priority value is not configured, the value of TLV 18 becomes zero. If an upstream channel class ID is configured and a ranging hold-off priority value is not configured, the UCD message includes TLV 18 and 19, and the value of TLV 18 becomes zero.

## Examples

The following example shows how to specify a ranging hold-off priority value for a logical upstream channel on a cable interface line card on the cisco uBR10012 router:

```
Router# config terminal
Router(config)# interface cable 5/0/0
Router(config-if)# cable upstream 0 rng-holdoff ff
```

## Associated Features

The **cable upstream rng-holdoff** command is associated with the [CM Steering on the Cisco CMTS Routers](#) feature.

| Related Commands | Command                             | Description                                                                                           |
|------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance exclude</b>   | Excludes a cable modem or a group of cable modems from DOCSIS load balance.                           |
|                  | <b>cable upstream chan-class-id</b> | Configures a channel class ID for a logical upstream channel on the CMTS router.                      |
|                  | <b>show cable modem verbose</b>     | Displays information about the registered and unregistered cable modems connected to the CMTS router. |

# cable upstream scheduling type

To enable various scheduler modes, use the **cable upstream scheduling type** command in interface configuration mode (cable interface only). To disable this feature, use the **no** form of this command.

**cable upstream *n* scheduling type [ugs | rtps] mode [llq | docsis]**

**no cable upstream *n* scheduling type [ugs | rtps] mode [llq | docsis]**

|                    |               |                                                                                                                      |
|--------------------|---------------|----------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i>      | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card. |
|                    | <b>ugs</b>    | (Optional) Selects scheduling for UGS.                                                                               |
|                    | <b>rtps</b>   | (Optional) Selects scheduling for rtPS.                                                                              |
|                    | <b>mode</b>   | Enables the selection of packet-based Low Level Queueing (LLQ) or TDM-based DOCSIS scheduling.                       |
|                    | <b>llq</b>    | (Optional) Selects LLQ scheduling.                                                                                   |
|                    | <b>docsis</b> | (Optional) Selects DOCSIS scheduling.                                                                                |

|                 |                                     |
|-----------------|-------------------------------------|
| Command Default | The only default is <b>docsis</b> . |
|-----------------|-------------------------------------|

|               |                                                           |
|---------------|-----------------------------------------------------------|
| Command Modes | Interface configuration —cable interface only (config-if) |
|---------------|-----------------------------------------------------------|

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13)BC  | This command was introduced.                                                                                       |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

|                  |                                                                                          |
|------------------|------------------------------------------------------------------------------------------|
| Usage Guidelines | Any combination of <b>ugs</b> , <b>rtps</b> , <b>llq</b> , and <b>docsis</b> is allowed. |
|------------------|------------------------------------------------------------------------------------------|

Note the following restrictions:

- To ensure proper operation, Call Admission Control (CAC) must be enabled. When the Low Latency Queueing (LLQ) option is enabled, it is possible for the upstream path to be filled with so many calls that it becomes unusable, making voice quality unacceptable. CAC must be used to limit the number of calls to ensure acceptable voice quality, as well as to ensure traffic other than voice traffic.
- Even if CAC is not enabled, the default (DOCSIS) scheduling mode blocks traffic after a certain number of calls.

|          |                                                                                                                                             |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows how to enable LLQ-type (packet-based) scheduling for UGS services on upstream port 4 on a Cisco CMTS interface: |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------|

```
Router(config-if)# cable upstream 4 scheduling type ugs mode llq
```

The following example shows how to enable standard DOCSIS (TDM-based) scheduling for rtPS services on upstream port 4 on a Cisco CMTS interface:

```
Router(config-if)# cable upstream 4 scheduling type rtps mode docsis
```

---

**Related Commands**

| Command                                   | Description                                                    |
|-------------------------------------------|----------------------------------------------------------------|
| <b>show interface cable mac-scheduler</b> | Use this command to confirm whether LLQ scheduling is enabled. |

---



# cable upstream scrambler

To enable the cable upstream scrambler, use the **cable upstream scrambler** command in cable interface configuration mode. To restore the default configuration value for this command, use the **no** form of this command.

**cable upstream *n* scrambler**

**no cable upstream *n* scrambler**

## Syntax Description

|          |                                                                                                                             |
|----------|-----------------------------------------------------------------------------------------------------------------------------|
| <i>n</i> | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card. |
|----------|-----------------------------------------------------------------------------------------------------------------------------|

## Command Default

Disabled

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release | Modification                 |
|---------|------------------------------|
| 11.3 XA | This command was introduced. |

## Usage Guidelines

This command causes CMs to enable their pseudo-random scrambler circuitry to improve the robustness of the upstream receiver on the line card.

The scrambler on the upstream radio frequency (RF) carrier enables CMs on the HFC network to use built-in scrambler circuitry for upstream data transmissions. The scrambler circuitry improves reliability of the upstream receiver on the cable interface line card. The upstream scrambler is activated by default and should not be disabled under normal circumstances.



### Caution

Scrambler must be activated for normal operation. Deactivate only for prototype CMs that do not support scrambler.

## Examples

The following example shows how to activate the upstream scrambler:

```
Router(config-if)# cable upstream 0 scrambler#
```

## Related Commands

| Command                         | Description                                                               |
|---------------------------------|---------------------------------------------------------------------------|
| <b>cable upstream fec</b>       | Enables the upstream FEC.                                                 |
| <b>cable upstream frequency</b> | Enters a fixed frequency of the upstream RF carrier for an upstream port. |

| Command                           | Description                                                                              |
|-----------------------------------|------------------------------------------------------------------------------------------|
| <b>cable upstream power-level</b> | Sets the input power level for the upstream RF carrier in decibels per millivolt (dBmV). |
| <b>cable upstream shutdown</b>    | Disables the upstream port.                                                              |

# cable upstream shutdown

To disable a single upstream physical or logical channel port, use the **cable upstream shutdown** command in cable interface configuration mode. To enable the upstream port, use the **no** form of this command.

## Physical Channel

**cable upstream *n* shutdown**

**no cable upstream *n* shutdown**

## Logical Channel

**cable upstream *n m* shutdown**

**no cable upstream *n m* shutdown**

## Syntax Description

|          |                                                                                                                             |
|----------|-----------------------------------------------------------------------------------------------------------------------------|
| <i>n</i> | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card. |
| <i>m</i> | Specifies the logical channel index of 0 or 1.                                                                              |

## Command Default

Upstream port is enabled

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                                                          |
|-------------|-----------------------------------------------------------------------|
| 11.3 XA     | This command was introduced.                                          |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.            |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.       |
| 12.2(33)SCC | This command was modified with the addition of logical channel index. |

## Usage Guidelines

The **cable upstream shutdown** command shuts down a single upstream physical or logical port without affecting any of the other upstream or downstream ports on the cable interface.



### Note

The **cable upstream shutdown** command exists at both physical and logical channel level with minor variations in the command syntax.

When multiple logical channels are configured, the upstream related CLIs are categorized into two groups: physical port level and logical channel level. Logical channel level commands use the format of **cable upstream *n m* shutdown**, where *n* denotes the physical port number, and *m* denotes the logical channel index number.

When multiple logical channels are configured, the **cable upstream shutdown** command at the physical level shuts down the upstream physical port and all the logical channels configured under that physical port. To shut down the entire interface, use the **shutdown** command in cable interface configuration mode.

Examples

The following example shows how to disable the upstream port for the physical channel:

```
Router(config-if)# cable upstream 0 shutdown
```

The following example shows how to disable the upstream port for the logical channel:

```
Router(config-if)# cable upstream 0 0 shutdown
```

Related Commands

| Command  | Description                                              |
|----------|----------------------------------------------------------|
| shutdown | Shuts down (disables) an interface and all of its ports. |

# cable upstream snr-polling

To configure how often cable interface cards with hardware spectrum management should poll an upstream to determine its Carrier-to-Noise Ratio (CNR), use the **cable upstream snr-polling** command in cable interface configuration mode.

**cable upstream** *n* **snr-polling** *interval-in-ms*

**Note**

This command can be used only on upstreams on the Cisco uBR-MC16S cable interface line cards.

**Syntax Description**

|                       |                                                                                                                             |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>              | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card. |
| <i>interval-in-ms</i> | The valid range is 1000 to 25000 milliseconds, with a default of 15000 milliseconds.                                        |

**Command Default**

5000 milliseconds

**Command Modes**

Interface configuration (cable interface only)

**Command History**

| Release    | Modification                                                                                            |
|------------|---------------------------------------------------------------------------------------------------------|
| 12.1(7)CX1 | This command was introduced for Cisco CMTS routers using the Cisco uBR-MC16S cable interface line card. |
| 12.2(8)BC2 | Support was added for the Cisco uBR10012 router and the Cisco uBR-LCP2-MC16S cable interface line card. |

**Usage Guidelines**

The Cisco uBR-MC16S cable interface line cards contain digital signal processors (DSPs) that perform hardware spectrum management. Use the **cable upstream snr-polling** command to determine how often that hardware should examine an upstream's signal to determine the current CNR value.

**Examples**

The following example shows how to configure the sixth upstream on a Cisco uBR-MC16S cable interface card so that the DSP samples the upstream signal every 10 seconds (10,000 milliseconds):

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 5 snr-polling 10000
Router(config-if)#
```

**Related Commands**

| Command                                  | Description                                                                                                                  |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>          | Creates a cable modulation profile.                                                                                          |
| <b>cable upstream modulation-profile</b> | Configures an upstream for one modulation profile (static profile) or two modulation profiles (Dynamic Upstream Modulation). |

| Command                              | Description                                                                                 |
|--------------------------------------|---------------------------------------------------------------------------------------------|
| <b>show cable hop</b>                | Displays the current hop period and threshold for an upstream, along with other statistics. |
| <b>show cable modulation-profile</b> | Displays the cable modulation profiles that have been created.                              |

# cable upstream spectrum-group

To assign a spectrum group to a single upstream on a cable interface line card, use the **cable upstream spectrum-group** command in interface configuration mode. To remove a spectrum group from an upstream, use the **no** form of this command.

**cable upstream** *n* **spectrum-group** *group-number*

**no cable upstream** *n* **spectrum-group** *group-number*

## Syntax Description

|                     |                                                                                                                                                                                                                                                                         |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>            | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                             |
| <i>group-number</i> | Specifies the spectrum group for which you are specifying a parameter value or specifies the number of the spectrum group you wish to remove from your router configuration. Valid range is from 1 to 32, or from 1 to 40, depending on the Cisco IOS software release. |

## Command Default

No default behavior or values.

## Command Modes

Interface configuration

## Command History

| Release     | Modification                                                                         |
|-------------|--------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced.                                                         |
| 12.2(15)BC2 | The maximum number of spectrum groups was increased from 32 to 40 groups per router. |

## Usage Guidelines

This command assigns a spectrum group to a single upstream on the cable interface line card. To configure the spectrum groups, use the set of **cable spectrum-group** commands in global configuration mode.



### Note

You can also spectrum groups to all of the upstreams on the cable interface using the **cable spectrum-group (interface configuration)** command.

## Examples

The following example shows how to assign spectrum group 12 to the first upstream on the cable interface line card in slot 5/0:

```
Router(config)# interface cable 5/0
Router(config-if)# cable upstream 0 spectrum-group 12
Router(config-if)# exit
Router(config)#
```

| Related Commands | Command                                               | Description                                                                                                                                                                  |
|------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable modulation-profile</b>                       | Configures preset modulation profiles that you can apply to one or more upstream cable interfaces when you identify and configure spectrum groups.                           |
|                  | <b>cable spectrum-group (global configuration)</b>    | Creates and configures a spectrum group.                                                                                                                                     |
|                  | <b>cable spectrum-group (interface configuration)</b> | Assigns a spectrum group to all of the upstreams on a cable interface line card.                                                                                             |
|                  | <b>cable spectrum-group hop period</b>                | Sets the minimum frequency-hop interval for a cable spectrum group.                                                                                                          |
|                  | <b>cable spectrum-group hop threshold</b>             | Specifies a hop threshold for a cable spectrum group.                                                                                                                        |
|                  | <b>cable spectrum-group shared</b>                    | Specifies the upstream ports in a spectrum group can share the same upstream frequency.                                                                                      |
|                  | <b>cable upstream hopping blind</b>                   | Disengages the advanced spectrum management features of the Cisco uBR-MC16S and Cisco uBR-MC5X20S/U cable interface line cards by enabling blind frequency hopping behavior. |



# cable upstream spreading-interval

To specify the spreading interval for Synchronous Code Division Multiple Access (S-CDMA) channels on an upstream channel, use the **cable upstream spreading-interval** command in cable interface configuration mode. To set the spreading interval value to its default setting, use the **no** form of this command.

**cable upstream** *n* **spreading-interval** *spreading-interval*

**no cable upstream** *n* **spreading-interval**

|                           |                           |                                                                                                                      |
|---------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i>                  | Specifies the upstream port. Valid values start with 0 for the first upstream port on the cable interface line card. |
|                           | <i>spreading-interval</i> | Specifies the spreading interval for S-CDMA channels. Valid values range from 1 to 32, with a default value of 16.   |

**Command Default** The spreading-interval setting cannot be applied if S-CDMA is not configured.

**Command Modes** Interface configuration (config-if)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCC    | This command was introduced. |

**Usage Guidelines** This command is applicable only for S-CDMA channels. You should configure S-CDMA to apply the spreading-interval.

**Examples** The following example sets the spreading interval to 32 on the upstream port 0:

```
Router(config)# interface cable 7/0/4
Router(config-if)# cable upstream 0 spreading-interval 32
Router(config-if)#
```

| <b>Related Commands</b> | <b>Command</b>                           | <b>Description</b>                                                                  |
|-------------------------|------------------------------------------|-------------------------------------------------------------------------------------|
|                         | <b>cable upstream active-codes</b>       | Specifies the number of active codes that can be configured on an upstream channel. |
|                         | <b>cable upstream codes-per-minislot</b> | Specifies the number of codes-per-minislot allowed on an upstream channel.          |

# cable upstream threshold

To configure the upstream for the carrier-to-noise ratio (CNR) or signal-to-noise ratio (SNR) and forward error correction (FEC) threshold values to be used in determining the allowable noise levels, use the **cable upstream threshold** command in cable interface configuration mode. To return to the default values, use the **no** form of the command.

## Cisco IOS Releases 12.2(8)BC2 and Earlier

```
cable upstream n threshold cnr-profile1 cnr-threshold1 cnr-profile2 cnr-threshold2
corr-fec fec-corrected uncorr-fec fec-uncorrected
```

```
no cable upstream n threshold cnr-profile1 cnr-threshold1 cnr-profile2 cnr-threshold2
corr-fec fec-corrected uncorr-fec fec-uncorrected
```

## Cisco IOS Releases 12.3(23)BC, 12.2(33)SCA and Later

### Physical Channel

```
lcable upstream n threshold { cnr-profiles cnr-threshold1 cnr-threshold2 | snr-profiles
snr-threshold1 snr-threshold2 | hysteresis hysteresis-value | corr-fec fec-corrected |
uncorr-fec fec-uncorrected }
```

```
no cable upstream n threshold { cnr-profiles | snr-profiles | hysteresis | corr-fec | uncorr-fec }
```

### Logical Channel

```
cable upstream n m threshold { snr-profiles snr-threshold1 snr-threshold2 | corr-fec fec-corrected
| uncorr-fec fec-uncorrected }
```

```
no cable upstream n m threshold { snr-profiles | corr-fec | uncorr-fec }
```

## Syntax Description

|                       |                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>              | Upstream port number. The valid values range from 0 to 3.                                                                                                                                                                                                                                                                                                                                         |
| <i>m</i>              | Logical channel index of 0 or 1.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>cnr-profiles</b>   | Specifies the CNR threshold in dB.                                                                                                                                                                                                                                                                                                                                                                |
| <i>cnr-threshold1</i> | CNR threshold for the primary modulation profile specified for the upstream.<br><br>The valid values range from 5 to 35 dB, with a default value of 25 dB.<br><br>To bypass both the primary and secondary CNR thresholds, set the first parameter ( <i>cnr-threshold1</i> ) to 0. This disallows the second parameter ( <i>cnr-threshold2</i> ), enabling you to bypass both the CNR thresholds. |
| <i>cnr-threshold2</i> | CNR threshold for the secondary modulation profile specified for the upstream.<br><br>The valid values range from 5 to 35 dB, with a default value of 15 dB. The secondary threshold value must be lesser than the primary threshold.<br><br>If the first parameter ( <i>cnr-threshold1</i> ) is set to 0, then the second parameter ( <i>cnr-threshold2</i> ) is not allowed.                    |
| <b>snr-profiles</b>   | Specifies the SNR threshold in dB.                                                                                                                                                                                                                                                                                                                                                                |

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>snr-threshold1</i>                     | <p>SNR threshold for the primary modulation profile specified for the upstream. This value is also used by the Cable Modem Upstream RF Adaptation feature.</p> <p>The valid values range from 5 to 35 dB, with a default value of 25 dB.</p> <p>You can bypass the primary SNR threshold (<i>snr-threshold1</i>) by setting it to 0.</p>                                                                      |
| <i>snr-threshold2</i>                     | <p>SNR threshold for the secondary modulation profile specified for the upstream.</p> <p>The valid values range from 5 to 35 dB, with a default value of 15 dB. The secondary threshold value must be lesser than the primary threshold.</p> <p>Though, you can bypass the primary SNR threshold (<i>snr-threshold1</i>) by setting it to 0, you must enter the second parameter (<i>snr-threshold2</i>).</p> |
| <b>hysteresis</b> <i>hysteresis-value</i> | <p>Specifies the hysteresis value to be used in conjunction with the dynamic modulation upgrade thresholds.</p> <p>The threshold is specified in dB, with a valid range of 0 to 10 dB, and a default value of 3 dB.</p> <p>You can bypass the <b>hysteresis</b> threshold by setting the value to 0.</p>                                                                                                      |
| <b>corr-fec</b> <i>fec-corrected</i>      | <p>Specifies the allowable number of correctable FEC errors for the upstream.</p> <p>The <i>fec-corrected</i> parameter is given as a percentage of total packets received on the upstream during the polling period, with a valid range of 1 to 30, and a default of 3.</p> <p>You can bypass the <b>corr-fec</b> threshold by setting the value to 0.</p>                                                   |
| <b>uncorr-fec</b> <i>fec-uncorrected</i>  | <p>Specifies the allowable number of uncorrectable FEC errors for the upstream.</p> <p>The <i>fec-uncorrected</i> parameter is given as a percentage of total packets received on the upstream during the polling period, with a valid range of 1 to 30, and a default of 1.</p> <p>You can bypass the <b>uncorr-fec</b> threshold by setting the value to 0.</p>                                             |

**Command Default**

Uses the default values.

**Command Modes**

Interface configuration (config-if)

**Command History**

| Release    | Modification                                                                                                                                                                                                   |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(7)CX1 | This command was introduced for Cisco CMTS routers using the Cisco uBR-MC16S cable interface line card.                                                                                                        |
| 12.2(8)BC2 | Support was added for the Cisco uBR10012 router and the Cisco uBR-LCP2-MC16S cable interface line card. Also, the ranges and defaults for the correctable and uncorrectable FEC error thresholds were changed. |

| Release     | Modification                                                                                                                                                                                                                                                                                         |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                                                                                           |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                                                                                                                                      |
| 12.2(33)SCC | This command was modified with the addition of <b>snr-profiles</b> keyword option and support was added for Cisco uBR-MC5X20H cable interface line card. Also, this command is used at both physical and logical channel level with slight variations in the command syntax for the uBR10012 router. |

### Usage Guidelines

Separate CNR or SNR thresholds are assigned to the primary and secondary modulation profiles. Both profiles, however, are assigned the same correctable and uncorrectable FEC values.



#### Note

The uncorrectable FEC error count includes packets that have header checksum errors and “no unique word detected” errors.

The **hysteresis** keyword of the **cable upstream threshold** command configures a hysteresis value to prevent upstream channels from becoming unstable and continuously changing between modulation profiles.

- The hysteresis value is used in dynamic modulation, frequency hopping, and dynamic channel-width changes.
- The hysteresis value is used in conjunction with CNR or SNR thresholds to determine channel configuration upgrade criteria for both advanced and basic spectrum management features.

The range and defaults for the correctable and uncorrectable FEC error thresholds were changed in Cisco IOS Release 12.2(8)BC2.

From Cisco IOS Release 12.2(33)SCC onwards, you can configure two logical channels on a single physical port for the uBR10012 router. When you configure logical channels, the upstream related commands are categorized into two groups: physical port level and logical channel level.

#### Physical Port Level

Physical port level commands use the format of **cable upstream *n***, where *n* denotes the physical port number.

#### Logical Channel Level

Logical channel level commands use the format of **cable upstream *n m***, where *n* denotes the physical port number, and *m* denotes the logical channel index number of 0 or 1.

The following restrictions and conditions applies to both physical and logical channel configurations:

- You can bypass both the primary and secondary CNR thresholds by setting the first parameter to 0. This disallows the second parameter, enabling you to bypass both the CNR thresholds.
- If you provide the primary CNR threshold, then you must enter the secondary CNR threshold also.
- You can bypass the primary SNR threshold by setting it to 0. However, you must enter the second parameter. This is required as each threshold is used independently in Three Step Dynamic Upstream Modulation feature.
- You can bypass the **hysteresis**, **corr-fec**, and **uncorr-fec** thresholds by setting their values to 0.

- For normal plant use, we recommend that the uncorrectable FEC threshold remain at its default of 1 percent to avoid an unacceptable number of errors on the channel.

## Examples

### Cisco IOS Releases 12.2(8)BC2 and Earlier

The following example shows upstream 5 configured with the CNR threshold for the primary modulation profile set to 20 dB, the CNR threshold for the secondary modulation profile set to 10 dB, the correctable FEC error rate set to 5 percent of total packets received on the upstream, and the uncorrectable FEC error rate set to 1 percent of total packets received on the upstream:

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 5 threshold cnr-profile1 20 cnr-profile2 10 corr-fec 5
uncorr-fec 1
Router(config-if)#
```

### Cisco IOS Releases 12.3(23)BC, 12.2(33)SCA and Later

The following example shows upstream 5 configured with the CNR threshold for the primary modulation profile set to 20 dB, the CNR threshold for the secondary modulation profile set to 10 dB, the correctable FEC error rate set to 5 percent of total packets received on the upstream, and the uncorrectable FEC error rate set to 1 percent of total packets received on the upstream:

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 5 threshold cnr-profiles 20 10
Router(config-if)# cable upstream 5 threshold corr-fec 5
Router(config-if)# cable upstream 5 threshold uncorr-fec 1
Router(config-if)#
```

The following example shows upstream 5 configured with the SNR threshold for the primary modulation profile set to 20 dB, the SNR threshold for the secondary modulation profile set to 10 dB, the correctable FEC error rate set to 5 percent of total packets received on the upstream, and the uncorrectable FEC error rate set to 1 percent of total packets received on the upstream:

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 5 threshold snr-profiles 20 10
Router(config-if)# cable upstream 5 threshold corr-fec 5
Router(config-if)# cable upstream 5 threshold uncorr-fec 1
Router(config-if)#
```

### SNR Example on the Cisco uBR10012 Router Only

The following example shows upstream 5 and logical channel 1 configured with the SNR threshold for the primary modulation profile set to 20 dB, the SNR threshold for the secondary modulation profile set to 10 dB, the correctable FEC error rate set to 5 percent of total packets received on the upstream, and the uncorrectable FEC error rate set to 1 percent of total packets received on the upstream:

```
Router(config)# interface cable 7/0/0
Router(config-if)# cable upstream 5 1 threshold snr-profiles 20 10
Router(config-if)# cable upstream 5 1 threshold corr-fec 5
Router(config-if)# cable upstream 5 1 threshold uncorr-fec 1
Router(config-if)#
```

| Related Commands | Command                                       | Description                                                                                                                                                               |
|------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable modulation-profile</b>               | Creates a cable modulation profile.                                                                                                                                       |
|                  | <b>cable modulation-profile global-system</b> | Creates a global cable modulation profile that allows to assign any number from 1 to 400 for modulation profiles, irrespective of the DOCSIS mode.                        |
|                  | <b>cable upstream hop-priority</b>            | Determines the order of the corrective actions to be taken when ingress noise exceeds the allowable value for an upstream.                                                |
|                  | <b>cable upstream modulation-profile</b>      | Configures an upstream for one modulation profile (static profile) or two modulation profiles (dynamic upstream modulation).                                              |
|                  | <b>cable upstream threshold rf-adapt</b>      | Configures the upstream RF adaptation threshold value, which prevents excessive relocation of modems from the primary upstream channel to the secondary upstream channel. |
|                  | <b>show cable hop</b>                         | Displays the current hop period and threshold for an upstream, along with other statistics.                                                                               |
|                  | <b>show cable modulation-profile</b>          | Displays the cable modulation profiles that have been created.                                                                                                            |

# cable upstream threshold hysteresis

To configure a hysteresis value to be used in conjunction with the dynamic modulation upgrade thresholds, use the **cable upstream threshold hysteresis** command in cable interface configuration mode. To use the default hysteresis value, use the **no** form of this command.

**cable upstream *n* threshold hysteresis *hysteresis-in-dB***

**no cable upstream *n* threshold hysteresis**

## Syntax Description

|                         |                                                                                                                                                   |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                       |
| <i>hysteresis-in-dB</i> | Specifies the hysteresis value to be used in conjunction with the dynamic modulation upgrade thresholds.<br>The valid values are from 0 to 10 dB. |

## Command Default

The default value of hysteresis is 3 dB.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release     | Modification                       |
|-------------|------------------------------------|
| 12.3(23)BC7 | This command was first introduced. |

## Usage Guidelines

The **cable upstream threshold hysteresis** command can be used to configure a hysteresis value to prevent upstream (US) channels from becoming unstable and continuously changing between modulation profiles.

- The hysteresis value is used in dynamic modulation, frequency hopping, and dynamic channel-width changes.
- The hysteresis value is used in conjunction with carrier-to-noise ratio (CNR) or signal-to-noise ratio (SNR) thresholds to determine channel configuration upgrade criteria for both advanced and basic spectrum management features.
- The hysteresis value is used for cable modem upstream RF adaptation upgrades from the secondary to the primary upstream channel.

## Examples

The following example configures a hysteresis value to be used in conjunction with the SNR and CNR thresholds for dynamic modulation upgrade.

```
Router(config)# interface cable 3/0
Router(config-if)# cable upstream 0 threshold hysteresis 5
Router(config-if)#
```

| Related Commands | Command                                  | Description                                                                                                                                                                                                                                                                                                                                                  |
|------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable modulation-profile</b>          | Creates a cable modulation profile.                                                                                                                                                                                                                                                                                                                          |
|                  | <b>cable upstream hop-priority</b>       | Determines the order of the corrective actions to be taken when ingress noise exceeds the allowable value for an upstream.<br><br><b>Note</b> This command is related to the <b>cable upstream threshold hysteresis</b> command only when using advanced dynamic modulation configuration, that is, when spectrum group is defined for the upstream channel. |
|                  | <b>cable upstream threshold</b>          | Configures the upstream for the carrier-to-noise ratio (CNR) or signal-to-noise ratio (SNR) and forward error correction (FEC) threshold values to be used in determining the allowable noise levels.                                                                                                                                                        |
|                  | <b>cable upstream threshold rf-adapt</b> | Configures the upstream RF adaptation threshold value, which prevents excessive relocation of modems from the primary upstream channel to the secondary upstream channel.                                                                                                                                                                                    |
|                  | <b>show cable modulation-profile</b>     | Displays the cable modulation profiles that have been created.                                                                                                                                                                                                                                                                                               |



# cable upstream threshold rf-adapt

To configure the upstream RF adaptation threshold value, which prevents excessive relocation of modems from the primary upstream channel to the secondary, use the **cable upstream threshold rf-adapt** command in cable interface configuration mode. To use the default rf-adapt value, use the **no** form of this command.

**cable upstream port threshold rf-adapt** *threshold1-in-percent*

**no cable upstream port threshold rf-adapt**

|                    |                              |                                                                                                                                                                                                                                 |
|--------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>port</i>                  | Upstream port number. The valid values start with 0 for the first upstream port on the cable interface line card and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
|                    | <i>threshold1-in-percent</i> | RF adaptation threshold value in percentage. The valid range is from 1 to 50. The value 0 indicates the RF adaptation threshold is bypassed. The default value is 10 percent.                                                   |

|                 |                                  |
|-----------------|----------------------------------|
| Command Default | The default value is 10 percent. |
|-----------------|----------------------------------|

|               |                                     |
|---------------|-------------------------------------|
| Command Modes | Interface configuration (config-if) |
|---------------|-------------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

**Usage Guidelines**

The rf-adapt threshold represents a percentage of affected modems relative to the total modem population on a given upstream channel. If the rf-adapt threshold is bypassed, then it is ignored while determining if a downgrade candidate should be relocated. The rf-adapt threshold is applied only to the physical channel and is used to prevent relocation of modems that are downgrade candidates.

The rf-adapt value is used by the upstream RF adaptation application to prevent the relocation of more than x% of the total modem population on that upstream channel, during PHY layer impairment.

**Examples**

The following example shows how to configure the rf-adapt threshold for cable modem upstream RF adaptation.

```
Router(config)# interface cable 8/0/0
Router(config-if)# cable upstream 0 threshold rf-adapt 25
```

| Related Commands | Command                                          | Description                                                                                                                                                           |
|------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable rf-adapt timer</b>                      | Configures timers for RF adaptation.                                                                                                                                  |
|                  | <b>cable upstream rf-adapt</b>                   | Enables RF adaptation on the physical upstream channel.                                                                                                               |
|                  | <b>cable upstream rf-adapt (logical channel)</b> | Configures the primary upstream logical channel and secondary upstream logical channel.                                                                               |
|                  | <b>cable upstream threshold</b>                  | Configures the upstream for the signal-to-noise ratio (SNR) and forward error correction (FEC) threshold values to be used in determining the allowable noise levels. |
|                  | <b>cable upstream threshold hysteresis</b>       | Configures the hysteresis value to be used in conjunction with the dynamic modulation upgrade thresholds.                                                             |
|                  | <b>show cable modem rf-adapt</b>                 | Displays the RF adaptation history.                                                                                                                                   |
|                  | <b>show cable rf-adapt</b>                       | Displays the downgrade and upgrade candidate lists.                                                                                                                   |

# cable upstream timing-adjust

To enable upstream timing adjustment for a specified cable interface, use the **cable upstream timing-adjust** command in cable interface configuration mode. To return to the default values, use the **no** form of this command.

**cable upstream *n* timing-adjust {continue *sec* | threshold *sec*}**

**no cable upstream *n* timing-adjust {continue *sec* | threshold *sec*}**

## Syntax Description

|                             |                                                                                                                                                                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                    | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card.                                      |
| <b>continue</b> <i>sec</i>  | Sets the minimum timing adjustment that sets <b>continue</b> ranging status in seconds. The range for <i>sec</i> is 2 to 64 seconds. Default value is 2 seconds. |
| <b>threshold</b> <i>sec</i> | Sets the timing adjustment threshold in seconds. Valid threshold value is 1 to 32 seconds. Default is 1 second.                                                  |

## Command Default

2 seconds for **continue** and 1 second for **threshold**

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release    | Modification                                                                                                                                                         |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA    | This command was introduced.                                                                                                                                         |
| 12.0(12)SC | This command was supported on the 12.0 SC release.                                                                                                                   |
| 12.1(3)T   | This command was supported on the 12.1 T release.                                                                                                                    |
| 12.1(3a)EC | This command was removed and no longer supported on the 12.1 EC and later releases (including those releases, such as 12.1 CX, that are based on the 12.1 EC train). |

## Usage Guidelines

To verify whether or not upstream timing adjustment is configured and activated, enter the **show running-config** command and look for the cable interface configuration information. If upstream timing adjustment is enabled, either or both of the **continue** and **threshold** timing adjustment entries are displayed in the **show running-config** output. If both the **continue** and **threshold** upstream timing adjustments are disabled, no timing adjustment entry is displayed in the **show running-config** output.

If you are having trouble, make sure that the cable connections are not loose or disconnected; the cable interface line card is firmly seated in its chassis slot; the captive installation screws are tight; and you have entered the correct slot and port numbers.



### Note

The **cable timing-adjust** command is applicable only on Cisco IOS Release 12.0(12)SC and Cisco IOS Release 12.1(3)T. It is deprecated and removed on Cisco IOS Release 12.1(3a)EC, 12.1(4)CX, and later releases.

---

**Examples**

The following example shows how to set the upstream time adjustment ranging value to 5 seconds:

```
CMTS01(config-if)# cable upstream 0 time-adjust continue 5
```

The following example shows how to set the threshold value to the default of 12 seconds:

```
CMTS01(config-if)# cable upstream 0 time-adjust threshold 12
```

# cable upstream unfrag-slot-jitter

To control how much jitter can be tolerated on the corresponding upstream due to unfragmentable slots, use the **cable upstream unfrag-slot-jitter** command in cable interface configuration mode. To disallow all jitter, use the **no** form of this command.

**cable upstream *n* unfrag-slot-jitter [*limit jitter* | **cac-enforce**]**

**no cable upstream *n* unfrag-slot-jitter [*limit jitter* | **cac-enforce**]**

## Syntax Description

|                     |                                                                                                                             |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>            | Specifies the upstream port number. Valid values start with 0 for the first upstream port on the cable interface line card. |
| <b>limit jitter</b> | Specifies the allowable jitter limit caused by unfragmentable slots, in microseconds (0 to 4,294,967,295).                  |
| <b>cac-enforce</b>  | Rejects service flows requesting jitter less than the fragmentable slot jitter.                                             |

## Command Default

By default, the limit is 0 microseconds and the **cac-enforce** option is enabled.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release    | Modification                                    |
|------------|-------------------------------------------------|
| 12.1(4)CX  | This command was introduced.                    |
| 12.2(4)BC1 | Support was added to the Release 12.2 BC train. |

## Usage Guidelines

This command controls how much jitter due to unfragmented slots is to be tolerated on each port. If the specified value for the tolerated limit is less than the size of a maximum unfragmentable slot, the MAC scheduler automatically blocks the slots in the scheduling table so that the unfragmentable slot can be accommodated in the blocked space and avoid causing excessive jitter to CBR slots.

The **cac-enforce** option enforces the rule that service flows requesting run-time jitter less than unfragmentable slot jitter should be rejected.

## Examples

The following example shows the jitter being set to 10 milliseconds (10,000 microseconds) for upstream port 0 on cable interface 2/0:

```
Router# configure terminal
Router(config)# interface c2/0
Router(config-if)# cable upstream 0 unfrag-slot-jitter limit 10000
Router(config-if)#
```

# cable util-interval

To set the load and utilization interval of upstream and downstream physical channels, use the **cable util-interval** command in global configuration mode. To remove the utilization interval, use the **no** form of this command.

**cable util-interval** *interval*

**no cable util-interval** *interval*

## Syntax Description

|                 |                                                                                                            |
|-----------------|------------------------------------------------------------------------------------------------------------|
| <i>interval</i> | Utilization interval for the upstream and downstream channels. The valid range is from 1 to 86400 seconds. |
|-----------------|------------------------------------------------------------------------------------------------------------|

## Command Default

The utilization interval is not set by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCD2 | This command was introduced. |

## Usage Guidelines

The **cable util-interval** command configures the same value as the **docsIfCmtsChannelUtilizationInterval** and **ccwbRFChanUtilInterval** objects.

The unit of *interval* is seconds and it is not recommended to set a smaller value as it may cause frequent utilization calculation that will consume more resources on both, the PRE and cable line card.

A value between 60 to 300 seconds or greater is recommended.

## Examples

The following example shows how to set the utilization interval for the upstream and downstream channels:

```
Router# configure terminal
Router(config)# cable util-interval 22
Router(config)#
```

## Related Commands

| Command                    | Description                                                          |
|----------------------------|----------------------------------------------------------------------|
| <b>show running-config</b> | Displays the running configuration for each of the cable interfaces. |

## cable vc-map

To map a cable modem to a particular permanent virtual connection (PVC) on an Asynchronous Transfer Mode (ATM) interface, use the **cable vc-map** command in global configuration mode. To remove this mapping, use the **no** form of this command.

**cable vc-map** *mac-address atm-interface vpi/vci* [*cust-name*]

**no cable vc-map** *mac-address*

**no cable vc-map customer** *cust-name*

### Syntax Description

|                                  |                                                                                                                                                   |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>mac-address</i>               | Specifies the hardware (MAC) address for the cable modem whose traffic is to be mapped.                                                           |
| <i>atm-interface</i>             | Specifies the outbound ATM interface to which this cable modem should be mapped.                                                                  |
| <i>vpi/vci</i>                   | Specifies the virtual path identifier (VPI) and virtual channel identifier (VCI) on the ATM interface to which this cable modem should be mapped. |
| <i>cust-name</i>                 | (Optional) Identifies the customer for this PVC. The <i>cust-name</i> can be any arbitrary alphanumeric string, up to 127 characters long.        |
| <b>customer</b> <i>cust-name</i> | (Optional) Deletes all PVCs belong to this customer. The <i>cust-name</i> can be any arbitrary alphanumeric string, up to 127 characters long.    |

### Command Default

No default behavior or values

### Command Modes

Global configuration

### Command History

| Release     | Modification                                                                                           |
|-------------|--------------------------------------------------------------------------------------------------------|
| 12.2(11)BC3 | This command was introduced for Cisco uBR7100 series and Cisco uBR7246VXR universal broadband routers. |
| 12.2(15)BC2 | Support for the <b>customer</b> option was added.                                                      |

### Usage Guidelines

This command maps a cable modem, on the basis of its hardware (MAC) address, to a particular PVC on an ATM interface.



#### Note

To use this command, you must first enable the use of Layer 2 tunnels, using the **cable l2-vpn-service atm-vc** command. Then use the **cable vc-map** command to enable the mapping of individual cable modems to specific PVCs.

**Examples**

The following example shows how to enable the use of Layer 2 tunnels and then map specific CMs to specific PVCS:

```
Router# config terminal
Router(config)# cable l2-vpn-service atm-vc
Router(config)# cable vc-map 0007.0e03.69f9 ATM2/0 1/1
Router(config)# cable vc-map 0010.7bed.9c95 ATM2/0 1/2
Router(config)# exit
Router#
```

The following example shows the same configuration as above, but with the addition of a customer name that identifies the customer that is using each particular PVC:

```
Router# config terminal
Router(config)# cable l2-vpn-service atm-vc
Router(config)# cable vc-map 0007.0e03.69f9 ATM2/0 1/1 ENTERPRISE-CO1
Router(config)# cable vc-map 0010.7bed.9c95 ATM2/0 1/2 ENTERPRISE-CO2
Router(config)# exit
Router#
```

**Related Commands**

| Command                            | Description                                                                                                                                                                                             |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable l2-vpn-service atm-vc</b> | Enables the use of Layer 2 tunnels for the Customer Premises Equipment (CPE) traffic that is behind cable modems, so that individual CPE traffic can be routed to a particular PVC on an ATM interface. |
| <b>debug cable l2-vpn</b>          | Displays debugging messages for the Layer 2 mapping of cable modems to a particular PVC on an ATM interface.                                                                                            |
| <b>show cable l2-vpn vc-map</b>    | Displays the mapping of one or all cable modems to PVCs on the ATM interfaces.                                                                                                                          |



# cable vrf-steering cable-modem

To steer or direct the cable modems to the first sub-bundle interface that is configured to use the virtual routing and forwarding (VRF) instance, use the **cable vrf-steering cable-modem** command in the cable subinterface configuration mode. To disable this feature, use the **no** form of this command.

**cable vrf-steering cable-modem** *vrf-name*

**no cable vrf-steering cable-modem** *vrf-name*

## Syntax Description

|                 |                    |
|-----------------|--------------------|
| <i>vrf-name</i> | VRF instance name. |
|-----------------|--------------------|

## Command Default

Configure a sub-bundle using the **ip vrf forwarding** command first to enable this command.

## Command Modes

Subinterface configuration (config-if)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCF | This command was introduced. |

## Examples

The following example shows how to direct the cable modems to the specified VRF:



### Note

Create an ACL and route-map to steer the CPEs from the CM interface to the global interface before you steer the CM to the first sub-bundle interface. Use the **ip access-list extended** *access-list name* and **route-map** *route map name* **permit** commands to create an ACL and route-map respectively on the Cisco uBR10012 routers. Use **ip policy route-map** *route map name* command to attach the route-map to the CM's subbundle interface.

```
Router(config-if)#cable vrf-steering cable-modem vrfa
```

## Related Commands

| Command                   | Description                                                                           |
|---------------------------|---------------------------------------------------------------------------------------|
| <b>cable source-route</b> | Configures the VRF source route on the cable modem's subinterface configuration mode. |
| <b>ip vrf</b>             | Defines a VRF instance and enters the interface configuration mode.                   |
| <b>show ip arp vrf</b>    | Displays which VRF contains a specific cable modem in the ARP table.                  |

# cable wideband auto-reset

To enable wideband auto-reset mode on the CMTS, use the **cable wideband auto-reset** command in global configuration mode. To disable wideband auto-reset mode, use the **no** form of this command.

```
cable wideband auto-reset

no cable wideband auto-reset
```

**Syntax Description** This command has no keywords or arguments.

**Command Default** Wideband auto-reset mode is disabled.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced for the uBR10012 router.            |
|                 | 12.3(23)BC  | This command was updated.                                       |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS release 12.2(33)SCA. |

**Usage Guidelines**

Use this command to enable wideband auto-reset mode on the CMTS. If wideband auto-reset mode is enabled, wideband cable modems registered on a cable interface as traditional DOCSIS modems (DOCSIS 1.x/2.0 modems) are auto-reset when the cable interface becomes wideband-capable. When a wideband cable modem auto-resets, it deregisters on the CMTS as a traditional DOCSIS cable modem and immediately attempts to re-register as a wideband cable modem.

A cable interface is considered wideband-capable when at least one fully configured and operational wideband channel has been associated with the interface’s traditional DOCSIS (narrowband) channel.

For a fully configured wideband CMTS, wideband cable modems may register as traditional DOCSIS modems for a variety of reasons, such as cable interface line card boot order or line card online insertion and removal (OIR). Rather than defer wideband cable modem registration, wideband cable modems are permitted to register as traditional DOCSIS modems.

If a wideband-capable modem registers as a traditional DOCSIS modem, it registers on a primary downstream channel that has been assigned with the **downstream cable** command to the modem’s fiber node if the fiber node is configured. If the modem’s fiber node is not configured, the wideband-capable modem can register on any downstream channel that is visible to it (as a traditional cable modem does).



**Note**

In Cisco IOS Release 12.3(21)BC, the primary downstream channel is a traditional DOCSIS downstream channel for the fiber node. Beginning in Cisco IOS Release 12.3(23)BC, either an RF channel from the SPA or a Cisco uBR10-MC5X20 downstream channel serves as a primary channel in a fiber node. Beginning in Cisco IOS Release 12.3(23)BC if the primary downstream channel for this fiber node is assigned from a SPA downstream, then the **downstream cable** command is not required.

When and if a cable interface becomes wideband capable, wideband cable modems that have registered as traditional DOCSIS modems are reset for CMTS routers with wideband auto-reset mode enabled. These modems are only reset when the interface first becomes wideband-capable and are not reset again if they subsequently fail to register as wideband cable modems.

### Examples

The following example shows how to enable wideband auto-reset mode:

```
Router# configure terminal
Router(config)# cable wideband auto-reset
```

### Related Commands

| Command                 | Description                                                           |
|-------------------------|-----------------------------------------------------------------------|
| <b>cable bundle</b>     | Configures a cable interface to belong to a virtual bundle interface. |
| <b>downstream cable</b> | Assigns a primary downstream channel for a fiber node.                |

■ cable wideband auto-reset



## Cable Commands: ca through cr

Revised: August 12, 2013, OL-15510-17

### New Commands

| Command                                  | Cisco IOS Software Release |
|------------------------------------------|----------------------------|
| clear cable modem name                   | 12.2(33)SCA                |
| clear cable modem voice                  | 12.3(23)BC                 |
| clear cable modem attribute-masks        | 12.2(33)SCB                |
| clear cable modem cm-status              | 12.2(33)SCB                |
| clear cable modem rcs-counts             | 12.2(33)SCB                |
| clear cable modem service-type-id        | 12.2(33)SCB                |
| clear cable rf-status                    | 12.2(33)SCB                |
| clear pxf statistics drl cable-wan-ip    | 12.2(33)SCB                |
| clear pxf statistics drl wan-non-ip      | 12.2(33)SCB                |
| clear cable ipc-stats                    | 12.2(33)SCC                |
| controller integrated-cable              | 12.2(33)SCC                |
| clear packetcable rks                    | 12.2(33)SCD                |
| clear hccp linecard                      | 12.2(33)SCE                |
| clear cable multicast statistics counter | 12.2(33)SCF                |
| clear cable modem rf-adapt               | 12.2(33)SCF3               |
| clear cable bgsync counters              | 12.2(33)SCG                |
| clear cable multicast ses-cache          | 12.2(33)SCH                |

### Modified Commands

| Command                  | Cisco IOS Software Release |
|--------------------------|----------------------------|
| clear cable host         | 12.2(33)SCA                |
| clear cable modem delete | 12.3(23)BC, 12.2(33)SCA    |
| clear cable modem reset  | 12.3(23)BC, 12.2(33)SCA    |

| Command                            | Cisco IOS Software Release |
|------------------------------------|----------------------------|
| <b>card</b>                        | 12.2(33)SCB                |
| <b>controller modular-cable</b>    | 12.2(33)SCB                |
| <b>clear cable modem cm-status</b> | 12.2(33)SCC                |
| <b>clear cable modem name</b>      | 12.2(33)SCD                |
| <b>clear cable modem cm-status</b> | 12.2(33)SCD                |
| <b>controller integrated-cable</b> | 12.2(33)SCD                |
| <b>controller modular-cable</b>    | 12.2(33)SCE                |
| <b>clear cable logging</b>         | 12.2(33)SCG                |

#### Replaced Commands

| Command                           | Replacement Command   | Effective Cisco IOS Release |
|-----------------------------------|-----------------------|-----------------------------|
| <b>clear cable modem counters</b> | <b>clear counters</b> | 12.2(15)BC1                 |

# channel-group

To add an interface (Gigabit Ethernet or Fast Ethernet) to an EtherChannel Group, and to associate that interface with an EtherChannel link, use the **channel-group** command in interface configuration mode.

To remove an EtherChannel interface from the EtherChannel group, use the **no** form of this command.

**channel-group** *n*

**no channel-group** *n*

## Syntax Description

|   |                                                                                                                                                                                                                                            |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n | The identifying number for the EtherChannel group with which to associate this interface. An EtherChannel group can be identified in the range of 1 to 64, and each group can have up to four interfaces, only one of which is the master. |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Defaults

By default, the **channel-group** command has the following behaviors:

- EtherChannel groups and ports are not defined.
- EtherChannel groups and ports are disabled (**off** mode) once configured, and must be enabled.
- The first port assigned to an EtherChannel group is the bundle master.

## Command Modes

Interface configuration (config-if)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(11)BC3 | This command was introduced on the Cisco uBR7246VXR router.                                                        |
| 12.2(9a)BC  | This command was introduced on the Cisco uBR10012 router.                                                          |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The **no** form of this command also removes the associated EtherChannel ports within the EtherChannel group. For additional information, refer to the EtherChannel on the Cisco CMTS Routers feature document on Cisco.com.

## Examples

The following example creates an EtherChannel link with a channel group identifier of 1 on the specified port. If this is the first port assigned to EtherChannel group 1, it becomes the master in that EtherChannel group.

```
Router(config-if)# channel-group etherchannel 1
```

Related Commands

| Command                     | Description                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------|
| show interface port-channel | Displays the EtherChannel interfaces and channel identifiers, with their mode and operational status. |



# channel-id (cable configuration file)

To create a DOCSIS configuration file that specifies the upstream channel ID for a CM configuration file, use the **channel-id** command in cable config-file configuration mode. To remove the channel ID specification, use the **no** form of this command.

**channel-id** *upstreamchan-id*

**no channel-id**

## Syntax Description

|                        |                                                                                                                                                 |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>upstreamchan-id</i> | Specifies the upstream channel ID. Valid range is 0 to 255, depending on the number of actual upstream ports on the cable interface being used. |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|

## Defaults

If no upstream channel ID is specified, the CM uses the upstream channel from the Upstream Channel Description (UCD) messages it receives on the downstream channel.

## Command Modes

Cable configuration file (config-file)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.1(2)EC1  | This command was introduced.                                                                                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

This command sets the Upstream Channel ID Configuration Setting field in the DOCSIS configuration file. Typically, the CM uses the upstream channel ID that is specified by the CMTS during the registration process, but this command overrides that setting and forces the CM to use the upstream channel specified in the DOCSIS configuration file. If that upstream does not exist, or if the upstream cannot be obtained for some reason, the CM cannot come online.



### Note

If you are using a telco-return CM, the upstream channel must be 0.

## Examples

The following example shows how to set the upstream channel ID for the configuration file to 3. If the CM cannot obtain this upstream channel, it does not come online.

```
Router(config)# cable config-file channeloverride.cm
Router(config-file)# channel-id 3
Router(config-file)# exit
```

**Related Commands**

| Command                  | Description                                                             |
|--------------------------|-------------------------------------------------------------------------|
| <b>cable config-file</b> | Creates a DOCSIS configuration file and enters configuration file mode. |
| <b>access-denied</b>     | Disables access to the network.                                         |
| <b>cpe max</b>           | Specifies CPE information.                                              |
| <b>download</b>          | Specifies download information for the configuration file.              |
| <b>frequency</b>         | Specifies downstream frequency.                                         |
| <b>option</b>            | Provides config-file options.                                           |
| <b>privacy</b>           | Specifies privacy options for baseline privacy images.                  |
| <b>service-class</b>     | Specifies service class definitions for the configuration file.         |
| <b>snmp manager</b>      | Specifies Simple Network Management Protocol (SNMP) options.            |
| <b>timestamp</b>         | Enables time-stamp generation.                                          |

# clear cable admission control counters

To reset all the resource counters on the Cisco CMTS to zero, use the **clear cable admission control counters** command in privileged EXEC mode.

**clear cable admission control counters**

**Command Default** No default behaviors or values

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced.                                                                                       |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** The counters are also set to zero when a given resource is reconfigured. Counters can be displayed using the **show cable admission-control** command.

For additional information, refer to the Admission Control for the Cisco CMTS feature documents on Cisco.com.

**Examples** The following example resets configured admission control counters to zero, whether configured in global or interface configuration mode:

```
Router# clear cable admission control counters
```

| Related Commands | Command                                     | Description                                                                                                     |
|------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
|                  | <b>cable admission-control</b>              | Configures the CPU and memory thresholds for the Cisco CMTS and supporting broadband processing engines (BPEs)  |
|                  | <b>cable admission-control event</b>        | Configures and enables Admission Control event types on the Cisco CMTS.                                         |
|                  | <b>cable admission-control ds-bandwidth</b> | Configures Admission Control downstream bandwidth thresholds on the Cisco CMTS.                                 |
|                  | <b>cable admission-control us-bandwidth</b> | Configures Admission Control upstream bandwidth thresholds on the Cisco CMTS.                                   |
|                  | <b>debug cable admission-control</b>        | Enables automatic Admission Control troubleshooting processes on the Cisco CMTS.                                |
|                  | <b>show cable admission-control</b>         | Displays the current Admission Control configuration and status on the Cisco CMTS, or on a specified interface. |

# clear cable arp-filter

To reset Address Resolution Protocol (ARP) filter statistics displayed by the **show cable arp-filter** command, use the **clear cable arp-filter** command in privileged EXEC mode.

```
clear cable arp-filter { bundle number | cable { slot/port | slot/subslot/port } }
```

|                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | bundle number           | Resets the ARP filter statistics for the specified virtual bundle interface, where <i>number</i> is a value from 1 to 255.                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                    | cable slot/port         | (Cisco uBR7100 and Cisco uBR7200 Series Routers) Specifies removal of CMs on the specified cable interface and downstream port, where: <ul style="list-style-type: none"><li>slot—Specifies the chassis slot number of the cable interface line card.</li><li>port—Specifies the downstream port number.</li></ul> Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
|                    | cable slot/subslot/port | (Cisco uBR10012 Router) Specifies removal of CMs on the specified cable interface, where: <ul style="list-style-type: none"><li>slot—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li><li>subslot—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li><li>port—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li></ul>                                                                    |

Syntax Description No default behavior or values

Command Modes Privileged EXEC (#)

|                 |             |                                                                                                                    |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
| Command History | Release     | Modification                                                                                                       |
|                 | 12.3(17a)BC | This command was introduced.                                                                                       |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

Usage Guidelines Use the **clear cable arp-filter** command to clear the ARP filter statistics that are displayed using the **show cable arp-filter** command.

## Examples

This example shows cable ARP filter statistics for virtual bundle interface number 10, followed by a clearing of the ARP filter statistics on that bundle and the resulting display of cleared statistics.

```
Router# show cable arp-filter bundle 10
ARP Filter statistics for Bundle10:
 Replies Rcvd: 3069 total. 3062 unfiltered, 7 filtered
 Requests Forwarded: 1175 total. 1175 unfiltered, 0 filtered
 Requests Sent For IP: 0 total. 0 unfiltered, 0 filtered
```

```
Router# clear cable arp-filter bundle 10
```

```
Router# show cable arp-filter bundle 10
ARP Filter statistics for Bundle10:
 Replies Rcvd: 0 total. 0 unfiltered, 0 filtered
 Requests Forwarded: 0 total. 0 unfiltered, 0 filtered
 Requests Sent For IP: 0 total. 0 unfiltered, 0 filtered
```

## Related Commands

| Command                      | Description                                                                                                                                       |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable arp filter</b>      | Controls the number of ARP packets that are allowable for each SID on a cable interface.                                                          |
| <b>clear arp-cache</b>       | Refreshes dynamically created entries from the ARP cache.                                                                                         |
| <b>show cable arp-filter</b> | Displays the total number of ARP replies and requests that have been sent and received, including the number of requests that have been filtered. |

# clear cable bgsync counters

To clear the background synchronization information on the Cisco CMTS, use the **clear cable bgsync counters** command in global configuration mode.

**clear cable bgsync counters**

**Syntax Description** There are no arguments or keywords.

**Command Modes** Global configuration mode (config)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

**Usage Guidelines** Use the **clear cable bgsync counters** command to clear the background synchronization information statistics on the Cisco CMTS.

**Examples** The following example shows how to clear the background synchronization counters on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# clear cable bgsync counters
Router(config)#
```

| Related Commands | Command                    | Description                                                               |
|------------------|----------------------------|---------------------------------------------------------------------------|
|                  | <b>cable bgsync</b>        | Sets the data intervals for background synchronization on the Cisco CMTS. |
|                  | <b>cable bgsync active</b> | Activates background synchronization process on the Cisco CMTS.           |
|                  | <b>show cable bgsync</b>   | Displays the information on the background synchronization process.       |

# clear cable ds

To reset counters related to DOCSIS Set-top Gateway (DS) tunnels, use the **clear cable ds** command in privileged EXEC mode.

## clear cable ds

### Syntax Description

This command has no arguments or keywords.

### Command Modes

Privileged EXEC (#)

### Command History

| Release     | Modification                                                                           |
|-------------|----------------------------------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced for the Cisco uBR7100 series and Cisco uBR7246VXR routers. |
| 12.3(13a)BC | This command is obsolete.                                                              |

### Usage Guidelines

DS operation is disabled using the **no cable ds** command, but this does not clear out the DS-related counter (“mapping entry is used”), so that you can retain its value in case you intend to restart DS operations again. If, however, you want to reset those counters to zero, use the **clear cable ds** command.



#### Note

This command resets the “mapping entry is used” counters for all DS tunnels and interfaces on the router.

### Examples

The following example shows how to clear the DS counters for all cable interfaces on the router, and shows an example of the **show cable ds** command showing the counters after they have been cleared.

```
Router# show cable ds stats

DSG statistics information

DSG keepalive is set

Vendor: DDD, Tunnel count: 1
Vendor: BBB, Tunnel count: 2

Vendor name is DDD, tunnel MAC is 0001.0002.0003
Group address is 226.2.2.2, source address is *
 Interface is Cable5/1, mapping entry is used 2
 Received 5968 packets, forwarded 5289 packets
 Dropped 679 packets, last second rate 16878 bits/sec

Router# clear cable ds
Router# show cable ds stats

DSG statistics information

Vendor: DDD, Tunnel count: 1
```

**clear cable dsg**

```

Vendor: BBB, Tunnel count: 2

Vendor name is DDD, tunnel MAC is 0001.0002.0003
Group address is 226.2.2.2, source address is *
Interface is Cable5/1, mapping entry is used 0
Received 5968 packets, forwarded 5289 packets
Dropped 679 packets, last second rate 16878 bits/sec

```

**Related Commands**

| Command                    | Description                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>cable dsg</b>           | Enables the DOCSIS Set-Top Gateway (DSG) on a cable interface, and configures its tunnel-mapping parameters. |
| <b>cable dsg keepalive</b> | Enables keepalive messages over DOCSIS Set-Top Gateway (DSG) tunnels on a cable interface.                   |
| <b>debug cable dsg</b>     | Enables the display of debugging messages for the operation of the DOCSIS Set-Top Gateway (DSG) feature.     |
| <b>show cable dsg</b>      | Displays the current DOCSIS Set-Top Gateway (DSG) tunneling parameters.                                      |



# clear cable flap-list

To reset the flap-list table for a specific CM or for all CMs connected to the Cisco CMTS router, use the **clear cable flap-list** command in privileged EXEC mode.

```
clear cable flap-list {mac-addr | all} [save-counters]
```

|                           |                      |                                                                                                                                                                                  |
|---------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>mac-addr</i>      | Specifies the 48-bit MAC address (hardware address) of an individual CM to be cleared from the flap-list table.                                                                  |
|                           | <b>all</b>           | Removes all CMs from the flap-list table.                                                                                                                                        |
|                           | <b>save-counters</b> | (Optional) Preserves the flap-list counters that are displayed by the <b>show cable flap-list</b> command and by using SNMP requests to access the CISCO-CABLE-SPECTRUM-MIB MIB. |

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | Clears the flap-list counters. |
|------------------------|--------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                                                                                                                    |
|------------------------|----------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                |
|                        | 11.3 NA        | This command was introduced.                                                                                       |
|                        | 11.3(7)NA      | The <b>save-counters</b> option was supported on the Cisco uBR7200 series routers.                                 |
|                        | 12.1(5)EC1     | Support was added for the Cisco uBR7100 series routers.                                                            |
|                        | 12.2(4)BC1     | Support for this command (without the <b>save-counters</b> option) was added for the Cisco uBR10012 router.        |
|                        | 12.2(15)BC2    | The <b>save-counters</b> option was supported on the Cisco uBR10012 router.                                        |
|                        | 12.3BC         | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

|                         |                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Cable modems are removed from the flap-list table after the number of days (between 1 and 60) specified by the <b>cable flap-list aging</b> global configuration command. Use the <b>clear cable flap-list</b> command to remove individual CMs from the flap-list while retaining flapping activity for other CMs, or to clear the entire flap-list table. |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                 |
|-----------------|---------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to remove all the CMs from the flap-list table: |
|-----------------|---------------------------------------------------------------------------------|

```
Router# clear cable flap-list all
```

| Related Commands | Command                                       | Description                                                                                               |
|------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                  | <b>cable flap-list aging</b>                  | Specifies the number of days to keep a CM in the flap-list table before aging it out of the table.        |
|                  | <b>cable flap-list insertion-time</b>         | Sets the insertion time interval that determines whether a CM is placed in the flap list.                 |
|                  | <b>cable flap-list miss-threshold</b>         | Specifies miss threshold for recording a flap-list event.                                                 |
|                  | <b>cable flap-list power-adjust threshold</b> | Specifies the power-adjust threshold for recording a CM flap-list event.                                  |
|                  | <b>cable flap-list size</b>                   | Specifies the maximum number of CMs that can be listed in the flap-list table.                            |
|                  | <b>clear cable modem counters</b>             | Zeroes the CM counters, including flap-list counters.                                                     |
|                  | <b>clear cable modem reset</b>                | Removes a CM from the Station Maintenance List and resets it.                                             |
|                  | <b>debug cable flap</b>                       | Displays information about the operation of the CM flap list that is maintained for the cable interfaces. |
|                  | <b>ping docsis</b>                            | Sends a DOCSIS ping to a CM and increments the flap-list counters as appropriate.                         |
|                  | <b>show cable flap-list</b>                   | Displays the current contents of the flap list.                                                           |

# clear cable hop

To clear the forward error corrections (FEC) hop counters on one or all cable interfaces on a Cisco CMTS, use the **clear cable hop** command in privileged EXEC mode.

**clear cable hop** [**cable** { *slot/port* | *slot/subslot/port* } [**upstream** *uport*]]

| Syntax Description                    |                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                    |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b> <i>slot/port</i>         | (Optional—Cisco uBR7100 and Cisco uBR7200 Series Routers)                                                                                                                                                                                                                                                                                                                                                         | Specifies removal of CMs on the specified cable interface and downstream port, where:                                                                                                                                              |
|                                       | <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card.</li> <li><i>port</i>—Specifies the downstream port number.</li> </ul>                                                                                                                                                                                                                      | Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
| <b>cable</b> <i>slot/subslot/port</i> | (Optional—Cisco uBR10012 Router)                                                                                                                                                                                                                                                                                                                                                                                  | Specifies removal of CMs on the specified cable interface, where:                                                                                                                                                                  |
|                                       | <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul> |                                                                                                                                                                                                                                    |
| <b>upstream</b> <i>uport</i>          | (Optional)                                                                                                                                                                                                                                                                                                                                                                                                        | Clears the hop counters on a specific upstream port on a specific cable interface. The valid values for <i>uport</i> start with 0 for the first upstream port on the cable interface line card.                                    |

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.2(15)BC1 | This command was introduced.                                    |
|                 | 12.3(BC)    | This command was integrated into Cisco IOS Release 12.3BC.      |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

**Usage Guidelines**

The **clear cable hop** command clears the correctable and uncorrectable forward error corrections (FEC) counters that are displayed by the **show cable hop** command. You can clear the counters for all interfaces on the Cisco CMTS, for one specific interface (one downstream and its associated upstreams), or for a specific upstream on a cable interface.

**Examples**

The following example shows how to clear the frequency hop counters on all cable interfaces on the Cisco CMTS, along with sample output from the **show cable hop** command that shows the counters being cleared:

```
Router# show cable hop
```

| Upstream Port | Port Status | Poll Rate (ms) | Missed Poll Count | Min Poll Sample        | Missed Poll Pcnt | Hop Thres Pcnt | Hop Period (sec) | Corr FEC Errors | Uncorr FEC Errors |
|---------------|-------------|----------------|-------------------|------------------------|------------------|----------------|------------------|-----------------|-------------------|
| Cable3/0/U0   | 15.008 Mhz  | 1000           | * * *             | set to fixed frequency | * * *            | * * *          |                  | 2238            | 133               |
| Cable3/0/U1   | admindown   | 1000           | * * *             | frequency not set      | * * *            | * * *          |                  | 0               | 0                 |
| Cable3/0/U2   | admindown   | 1000           | * * *             | frequency not set      | * * *            | * * *          |                  | 0               | 0                 |
| Cable3/0/U3   | admindown   | 1000           | * * *             | frequency not set      | * * *            | * * *          |                  | 0               | 0                 |

```
Router# clear cable hop
```

```
Router# show cable hop
```

| Upstream Port | Port Status | Poll Rate (ms) | Missed Poll Count | Min Poll Sample        | Missed Poll Pcnt | Hop Thres Pcnt | Hop Period (sec) | Corr FEC Errors | Uncorr FEC Errors |
|---------------|-------------|----------------|-------------------|------------------------|------------------|----------------|------------------|-----------------|-------------------|
| Cable3/0/U0   | 15.008 Mhz  | 1000           | * * *             | set to fixed frequency | * * *            | * * *          |                  | 0               | 0                 |
| Cable3/0/U1   | admindown   | 1000           | * * *             | frequency not set      | * * *            | * * *          |                  | 0               | 0                 |
| Cable3/0/U2   | admindown   | 1000           | * * *             | frequency not set      | * * *            | * * *          |                  | 0               | 0                 |
| Cable3/0/U3   | admindown   | 1000           | * * *             | frequency not set      | * * *            | * * *          |                  | 0               | 0                 |

```
Router#
```

The following example shows how to clear the frequency hop counters on a specific cable interface on the Cisco CMTS:

```
Router# clear cable hop c5/0
```

```
Router#
```

The following example shows how to clear the frequency hop counters on a specific upstream on the Cisco CMTS:

```
Router# clear cable hop c5/1/0 upstream 2
```

```
Router#
```

**Related Commands**

| Command                 | Description                                    |
|-------------------------|------------------------------------------------|
| <b>show cable hop</b>   | Displays cable-hop statistics on a Cisco CMTS. |
| <b>show cable modem</b> | Displays CM configuration settings.            |

# clear cable host

To clear the host from the router's internal address tables, use the **clear cable host** command in privileged EXEC mode.

**clear cable host** { *ip-address* | *mac-address* | **name** *fqdn* }

|                           |                         |                                                                                                                                                                                                                                                          |
|---------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>ip-address</i>       | IPv4 or IPv6 address for the device to be cleared.                                                                                                                                                                                                       |
|                           | <i>mac-address</i>      | MAC address for the device to be cleared.                                                                                                                                                                                                                |
|                           | <b>name</b> <i>fqdn</i> | Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 11.3 NA        | This command was introduced for the Cisco uBR7200 series universal broadband router.                                                                                                                                                                                                                                                                                                         |
|                        | 12.1(5)EC1     | Support was added for the Cisco uBR7100 series universal broadband router.                                                                                                                                                                                                                                                                                                                   |
|                        | 12.2(4)BC1     | Support was added for the Cisco uBR10012 universal broadband router.                                                                                                                                                                                                                                                                                                                         |
|                        | 12.3BC         | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                                                                                                                                                                                   |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |

**Usage Guidelines** This command removes a host's IP, MAC address, or domain name from the router's internal address tables. This might be necessary to allow a new host to come online from the previous host's CM.



**Note**

If the cleared host continues communicating through the CM, the Cisco CMTS adds the host back to its internal address tables, and the **show interface cable interface modem** command shows it as having a "static" address. To block the host from any further access, use the **cable source-verify dhcp** command, so that the host cannot access the network unless it obtains an IP address from an authorized DHCP server.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Examples**

The following example shows how to remove a host's MAC address from the internal address tables on the Cisco CMTS router:

```
Router# clear cable host 0050.7366.17ab
```

The following example shows how to remove a host's domain name from the internal address tables on the Cisco CMTS router:

```
Router# clear cable host cisco
```

**Related Commands**

| Command                               | Description                                                  |
|---------------------------------------|--------------------------------------------------------------|
| <b>cable device</b>                   | Configures the access list for a CM device or host.          |
| <b>cable host access-group</b>        | Configures the access list for the specified hosts.          |
| <b>show cable device access-group</b> | Display the CMs and the hosts behind the CMs on the network. |
| <b>show cable host access-group</b>   | Displays only the hosts behind the CMs on the network.       |

# clear cable ipc-stats

To clear the active database and reset all IPC statistics in the active database to zero, use the **clear cable ipc-stats** command in privileged EXEC mode.

## clear cable ipc-stats

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                                                               |
|------------------------|----------------|---------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                           |
|                        | 12.2(33)SCC    | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

|                         |                                                                                                                                                          |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | You must enable the Cable IPC Statistics Collection tool using the <b>cable ipc-stats</b> command before using the <b>clear cable ipc-stats</b> command. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                     |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to clear the active database using the <b>clear cable ipc-stats</b> command on a Cisco CMTS router: |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|

```
Router# clear cable ipc-stats
```

```
cr10k ipc stats is cleared at 03:38:54 PDT Fri Oct 9 2009
Router#
```

|                         |                             |                                                                          |
|-------------------------|-----------------------------|--------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>              | <b>Description</b>                                                       |
|                         | <b>cable ipc-stats</b>      | Enables the Cable IPC Statistics Collection tool on a Cisco CMTS router. |
|                         | <b>show cable ipc-stats</b> | Displays statistics of all the IPC messages on a Cisco CMTS router.      |

# clear cable load-balance

To clear the counters or state machine used to track load-balancing operations, use the **clear cable load-balance** command in privileged EXEC mode.

**clear cable load-balance {counters | state}**

## Syntax Description

|                 |                                                                                                                                                                                                                                                                  |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>counters</b> | Clears all load balancing statistical counters.                                                                                                                                                                                                                  |
| <b>state</b>    | Clears all state information in the load balancing state machine. This command will also put all cable interfaces and their upstream channels in the “up” state, unless they are explicitly shut down using the <b>shutdown</b> interface configuration command. |

## Command Default

No default behavior or values

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers.                                   |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Examples

The following example shows how to clear all of the counters that track load-balancing operations, resetting them all to zero:

```
Router# clear cable load-balance counters
```

The following example shows how to clear the state machine that is used for load-balancing operations.

```
Router# clear cable load-balance state
```

## Related Commands

| Command                                                   | Description                                                                                                                           |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance exclude</b>                         | Excludes a particular cable modem, or all cable modems from a particular vendor, from one or more types of load-balancing operations. |
| <b>cable load-balance group (global configuration)</b>    | Creates and configures a load-balance group.                                                                                          |
| <b>cable load-balance group (interface configuration)</b> | Assigns a downstream to a load-balance group.                                                                                         |
| <b>cable load-balance group interval</b>                  | Configures the frequency of the load-balancing policy updates.                                                                        |



| Command                                    | Description                                                                                                               |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance group policy ugs</b> | Configures how the Cisco CMTS should load balance cable modems with active unsolicited grant service (UGS) service flows. |
| <b>cable load-balance group threshold</b>  | Configures the threshold values that a load-balance group should use for load-balancing operations.                       |
| <b>cable upstream load-balance group</b>   | Assigns an upstream to a load-balance group.                                                                              |
| <b>show cable load-balance</b>             | Displays real-time statistical and operational information for load-balancing operations.                                 |

# clear cable logging

To remove all error messages about bad IP source addresses on the cable interfaces from the error log buffer, or to clear the downstream index buffer, use the **clear cable logging** command in privileged EXEC mode.

```
clear cable logging {badipsource | downstream-index}
```

|                    |                         |                                                      |
|--------------------|-------------------------|------------------------------------------------------|
| Syntax Description | <b>badipsource</b>      | Clears the log buffer for BADIPSOURCE messages.      |
|                    | <b>downstream-index</b> | Clears the log buffer for downstream index messages. |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                                                                                                                                |
|-----------------|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                                                                                            |
|                 | 12.1(13)EC     | This command was introduced for the Cisco uBR7100 series and Cisco uBR7200 series universal broadband routers.                 |
|                 | 12.2(11)CY     | Support was added for the Cisco uBR10012 universal broadband router.                                                           |
|                 | 12.2(11)BC2    | Support was added to the Release 12.2 BC train for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers. |
|                 | 12.3BC         | This command was integrated into Cisco IOS Release 12.3BC.                                                                     |
|                 | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.             |
|                 | 12.2(33)SCG    | The <b>downstream-index</b> keyword was added.                                                                                 |

The **cable logging badipsource** command creates a circular buffer that contains the BADIPSOURCE error messages that the Cisco CMTS generates when it discovers a CM or CPE device using an unauthorized IP address. When the buffer becomes full, the oldest messages are deleted to make room for newer messages.

When you have viewed all of the error messages in the current buffer, use the **clear cable logging** command to clear out the buffer to make room for newer messages.

The following example shows how to clear the log buffer that contains the bad IP source address error messages:

```
Router# show cable logging summary

Cable logging: BADIPSOURCE Enabled
 Total buffer size (bytes): 1000000
 Used buffer size (bytes) : 36968
 Logged messages : 231

Router# clear cable logging badipsource
Router# show cable logging summary

Cable logging: BADIPSOURCE Enabled
 Total buffer size (bytes): 1000000
```

```

 Used buffer size (bytes) : 0
 Logged messages : 0
Router#

```

The following example shows how to clear the log buffer that contains the downstream index messages:

```

Router# show cable logging downstream-index

Cable logging: Enabled
 Total buffer size (bytes): 1000000
 Used buffer size (bytes) : 36968
 Logged messages : 231
Router# clear cable logging downstream-index
Router# show cable logging downstream-index

Cable logging: Enabled
 Total buffer size (bytes): 1000000
 Used buffer size (bytes) : 0
 Logged messages : 0
Router#

```

#### Related Commands

|                                       |                                                                               |
|---------------------------------------|-------------------------------------------------------------------------------|
| <b>cable logging badipsource</b>      | Logs error messages about bad IP source addresses on the cable interfaces.    |
| <b>cable logging downstream-index</b> | Logs buffer messages about the downstream indexes.                            |
| <b>cable source-verify</b>            | Enables verification of IP addresses for CMs and CPE devices on the upstream. |
| <b>show cable logging</b>             | Displays the log of error and buffer messages on the cable interfaces.        |

# clear cable modem attribute-masks

To clear the cable modem attribute masks, use the **clear cable modem attribute-masks** command in privileged EXEC mode.

```
clear cable modem {mac-addr | ip-addr | cable slot/port {all | oui string | reject} } attribute-masks

clear cable modem {mac-addr | ip-addr | cable slot/subslot/port {all | oui string | reject} }
attribute-masks
```

Syntax Description

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mac-addr                | Specifies the MAC address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ip-addr                 | Specifies the IP address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| cable slot/port         | (Optional—Cisco uBR7100 and Cisco uBR7200 Series Routers) Specifies removal of CMs on the specified cable interface and downstream port, where: <ul style="list-style-type: none"><li>slot—Specifies the chassis slot number of the cable interface line card.</li><li>port—Specifies the downstream port number.</li></ul> Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
| cable slot/subslot/port | (Optional—Cisco uBR10012 Router) Specifies removal of CMs on the specified cable interface, where: <ul style="list-style-type: none"><li>slot—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li><li>subslot—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li><li>port—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li></ul>                                                                    |
| all                     | Resets the flapping counters for all CMs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| oui string              | Resets the flapping counters for all CMs that match the specified Organization Unique Identifier (OUI). The string parameter can be either the three-byte hexadecimal string (such as 00.00.0C).                                                                                                                                                                                                                                                                                                                                                               |
| reject                  | Resets the flapping counters for all CMs that are currently in one of the reject states.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| attribute-masks         | Specifies the attribute mask bitmap in hexadecimal format.<br>Example: 0-FFFFFFFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Command Default

No default behavior or values for this command

Command Modes

Privileged EXEC (#)

**Command History**

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

**Usage Guidelines**

This command clears the cable modem attribute masks.

**Examples**

The following example shows how to clear cable modem attribute masks for CMs:

```
Router# clear cable modem all attribute-masks
Router# clear cable modem oui SA attribute-masks
Router# clear cable modem c5/0/0 offline attribute-masks
```

**Related Commands**

| Command                              | Description                                                              |
|--------------------------------------|--------------------------------------------------------------------------|
| <b>cable upstream attribute-mask</b> | This command specifies an upstream attribute mask in hexadecimal format. |

# clear cable modem cm-status

To reset the cable modem status events to zero, use the **clear cable modem cm-status** command in privileged EXEC mode.

Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers

```
clear cable modem [ip address | mac address | cable slot/port] cm-status
```

Cisco uBR10012 Universal Broadband Router

```
clear cable modem [ip address | mac address | cable slot/subslot/port] cm-status
```

Syntax Description

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>                     | (Optional) IP address of a CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                            |
| <i>mac-address</i>                    | (Optional) MAC address of a CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                          |
| <b>cable</b> <i>slot/subslot/port</i> | (Optional) Cable interface on the Cisco uBR10012 router. The following are the valid values: <ul style="list-style-type: none"><li><i>slot</i> = 5 to 8</li><li><i>subslot</i> = 0 or 1</li><li><i>port</i> = 0 to 4 (depending on the cable interface)</li></ul>                                                                                                                                                                           |
| <b>cable</b> <i>slot/port</i>         | (Optional) Displays information for all CMs on the specified cable interface and downstream port on the Cisco uBR7225VXR and Cisco uBR7246VXR routers, where: <ul style="list-style-type: none"><li><i>slot</i>—Slot where the line card resides.<br/>Cisco uBR7246VXR router—The valid range is from 3 to 6<br/>Cisco uBR7225VXR router—The valid range is from 1 to 2</li><li><i>port</i>—Specifies the downstream port number.</li></ul> |
| <b>cm-status</b>                      | Resets the CM status events to zero on the specified cable interface.                                                                                                                                                                                                                                                                                                                                                                       |

Command Modes

Privileged EXEC (#)

Command History

| Release     | Modification                                                                                                                 |
|-------------|------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCB | This command was introduced.                                                                                                 |
| 12.2(33)SCC | This command was modified to clear the basic receive-statistics of all event code types for a specific CM or a group of CMs. |
| 12.2(33)SCD | This command was modified. Support was added for Cisco uBR7225VXR and Cisco uBR7246VXR routers.                              |

**Related Commands**

| Command                         | Description                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>clear cable flap-list</b>    | Resets the flap-list table for a specific CM or for all CMs.                                                                         |
| <b>clear cable modem delete</b> | Removes one or more CMs from the internal address and routing tables on a CMTS router and stops DOCSIS station maintenance messages. |
| <b>clear cable modem lock</b>   | Resets the lock on one or more CMs.                                                                                                  |
| <b>clear cable modem name</b>   | Removes or resets CMs by domain name.                                                                                                |
| <b>clear cable modem reset</b>  | Removes one or more CMs from the Station Maintenance List and resets them.                                                           |

# clear cable modem counters



## Note

Effective with Cisco IOS Release 12.2(15)BC1, the **clear cable modem counters** command is replaced by the **clear counters** command. See the **clear counters** command in the Cisco IOS software command reference documentation for more information.

To reset the cable modem (CM) flap-list counters to zero, use the **clear cable modem counters** command in privileged EXEC mode.

```
clear cable modem {mac-addr | ip-addr | [cable {slot/port | slot/subslot/port}] {all | oui string | reject}} counters
```

## Syntax Description

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>mac-addr</i>                       | Specifies the 48-bit hardware address (MAC address) of an individual CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>ip-addr</i>                        | Specifies the IP address of an individual CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>cable</b> <i>slot/port</i>         | (Optional—Cisco uBR7100 and Cisco uBR7200 Series Routers)<br>Specifies removal of CMs on the specified cable interface and downstream port, where: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card.</li> <li><i>port</i>—Specifies the downstream port number.</li> </ul> Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
| <b>cable</b> <i>slot/subslot/port</i> | (Optional—Cisco uBR10012 Router) Specifies removal of CMs on the specified cable interface, where: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul>                                                               |
| <b>all</b>                            | Resets the flapping counters for all CMs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>oui</b> <i>string</i>              | Resets the flapping counters for all CMs that match the specified Organization Unique Identifier (OUI). The <i>string</i> parameter can be either the three-byte hexadecimal string (such as 00.00.0C) or a vendor name that has been defined using the <b>cable modem vendor</b> command.                                                                                                                                                                                                                                                                                         |
| <b>reject</b>                         | Resets the flapping counters for all CMs that are currently in one of the reject states. (See the <b>show cable modem</b> command for a description of these states.)                                                                                                                                                                                                                                                                                                                                                                                                              |

## Command Default

No default behavior or values



**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                  |
|-----------------|-------------|-------------------------------------------------------------------------------|
|                 | 12.1 T      | This command was introduced.                                                  |
|                 | 12.2(11)BC2 | Support was added for the <b>oui</b> and <b>reject</b> options.               |
|                 | 12.2(11)BC3 | Support for clearing the counters for a particular cable interface was added. |
|                 | 12.2(15)BC1 | This command was replaced by the <b>clear counters</b> command.               |

### Examples

The following example shows how to clear the counters for the CM at IP address 172.16.23.45:

```
Router# clear cable modem 172.16.23.45 counters
```

The following example shows how to clear the counters for all CMs that have an OUI that has been defined as having the vendor name of Cisco using the **cable modem vendor** command:

```
Router# clear cable modem oui Cisco counters
```

The following example shows how to clear the counters for all CMs that are currently in one of the reject states:

```
Router# clear cable modem reject counters
```



#### Note

If running Cisco IOS Release 12.2(15)BC1 or later, use the **clear cable modem flap-counters** command to clear the CM flap-list counters.

| Related Commands | Command                                | Description                                                                                                                          |
|------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>clear cable flap-list</b>           | Resets the flap-list table for a specific CM or for all CMs.                                                                         |
|                  | <b>clear cable modem delete</b>        | Removes one or more CMs from the internal address and routing tables on a CMTS router and stops DOCSIS station maintenance messages. |
|                  | <b>clear cable modem flap-counters</b> | Resets the CM flap-list counters to zero.                                                                                            |
|                  | <b>clear cable modem lock</b>          | Resets the lock on one or more CMs.                                                                                                  |
|                  | <b>clear cable modem reset</b>         | Removes one or more CMs from the Station Maintenance List and resets them.                                                           |
|                  | <b>clear counters</b>                  | Resets interface counters and those counters associated with the <b>show cable modem counters</b> command.                           |

# clear cable modem delete

To remove one or more cable modems (CMs) from the internal address and routing tables on a CMTS router and stop DOCSIS station maintenance messages, use the **clear cable modem delete** command in privileged EXEC mode.

**clear cable modem** {*ip-addr* | *mac-addr*} **delete**

**clear cable modem** [**cable** {*slot/port* | *slot/subslot/port*}] [**all** | **non-bonding-capable** [**legacy-ranging**] | **offline** | **oui string** | **reject** | **wideband** [**registered-traditional-docsis**]] **delete**

## Syntax Description

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-addr</i>                        | Specifies removal of an individual CM by its IPv4 or IPv6 address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>mac-addr</i>                       | Specifies removal of an individual CM by its 48-bit hardware address (MAC address).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>cable</b> <i>slot/port</i>         | (Optional—Cisco uBR7100 and Cisco uBR7200 Series Routers)<br>Specifies removal of CMs on the specified cable interface and downstream port, where: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card.</li> <li><i>port</i>—Specifies the downstream port number.</li> </ul> Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
| <b>cable</b> <i>slot/subslot/port</i> | (Optional—Cisco uBR10012 Router) Specifies removal of CMs on the specified cable interface, where: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul>                                                               |
| <b>all</b>                            | Specifies removal of all CMs or all CMs associated with a specified cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>non-bonding-capable</b>            | Specifies removal of all narrowband CMs that are not capable of downstream channel bonding or all such CMs associated with a specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>legacy-ranging</b>                 | (Optional) Specifies removal of narrowband CMs that are accessed with legacy initial ranging or all such CMs associated with a specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>offline</b>                        | Specifies removal of all offline CMs or all such CMs associated with a specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                                         |                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>oui string</b>                       | Specifies removal of all CMs that match the specified Organization Unique Identifier (OUI) or all such CMs associated with a specified interface. The <i>string</i> parameter can be either the three-byte hexadecimal string (such as 00.00.0C) or a vendor name that has been defined using the <b>cable modem vendor</b> command. |
| <b>reject</b>                           | Specifies removal of all CMs that are currently in one of the reject states or all such CMs associated with a specified interface. (See the <b>show cable modem</b> command for a description of these states.)                                                                                                                      |
| <b>wideband</b>                         | Specifies removal of all wideband CMs or or all such CMs associated with a specified interface.                                                                                                                                                                                                                                      |
| <b>registered-traditional-docsis is</b> | (Optional) Specifies removal of all wideband CMs that are registered as traditional DOCSIS CMs or all such CMs associated with a specified interface.                                                                                                                                                                                |

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                                                                                                         |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(11)BC3 | This command was introduced for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 universal broadband routers.                                                                                                                                      |
|                 | 12.2(15)BC1 | The <b>cable</b> keyword option was added.                                                                                                                                                                                                                           |
|                 | 12.3(23)BC  | Support was added for the <b>non-bonding-capable</b> , <b>legacy-ranging</b> , <b>wideband</b> , and <b>registered-traditional-docsis</b> keyword options.                                                                                                           |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM was added.</li> </ul> |

**Usage Guidelines** This command removes one or more CMs from the CMTS router memory, which causes the CMTS router to stop all DOCSIS station maintenance messages for the specified CMs until they time out and reattempt initial ranging.



**Caution**

The **clear cable modem all delete** command should normally be used only on a test or lab network. If used on a large network, it could impact service for a significant period of time, as it would force all CMs to simultaneously reset and reregister with the Cisco CMTS. In addition, if HCCP N+1 redundancy has also been configured, using the **clear cable modem delete** command can trigger a switchover to one or more Protect interfaces, unless **no keepalive** has also been configured on the cable interfaces.

**Examples** The following example shows how to delete the CM at IP address 172.23.45.67:

```
Router# clear cable modem 172.23.45.67 delete
```

The following example shows how to delete all CMs that have a OUI that has been defined as having the vendor name of Cisco using the **cable modem vendor** command:

```
Router# clear cable modem oui Cisco delete
```

The following example shows how to delete all CMs that are currently in one of the reject states:

```
Router# clear cable modem reject delete
```

#### Related Commands

| Command                                 | Description                                                                |
|-----------------------------------------|----------------------------------------------------------------------------|
| <b>clear cable flap-list</b>            | Resets the flap-list table for a specific CM or for all CMs.               |
| <b>clear cable modem flap -counters</b> | Resets the CM flap-list counters to zero.                                  |
| <b>clear cable modem lock</b>           | Resets the lock on one or more CMs.                                        |
| <b>clear cable modem name</b>           | Removes or resets CMs by domain name.                                      |
| <b>clear cable modem reset</b>          | Removes one or more CMs from the Station Maintenance List and resets them. |
| <b>show cable modem</b>                 | Displays information for the registered and unregistered CMs.              |

# clear cable modem flap-counters

To reset the cable modem (CM) flap-list counters to zero, use the **clear cable modem flap-counters** command in privileged EXEC mode.

**clear cable modem** {*ip-addr* | *mac-addr*} **flap-counters**

**clear cable modem** [**cable** {*slot/port* | *slot/subslot/port*}] {**all** | **offline** | **oui string** | **reject**} **flap-counters**

| Syntax Description                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-addr</i>                        | Resets the flap-list counters for an individual CM by its IPv4 or IPv6 address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>mac-addr</i>                       | Resets the flap-list counters for an individual CM by its 48-bit hardware address (MAC address).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>cable</b> <i>slot/port</i>         | <p>(Optional—Cisco uBR7100 and Cisco uBR7200 Series Routers) Resets the flap-list counters for all CMs on the specified cable interface and downstream port, where:</p> <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card.</li> <li><i>port</i>—Specifies the downstream port number.</li> </ul> <p>Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering.</p> |
| <b>cable</b> <i>slot/subslot/port</i> | <p>(Optional—Cisco uBR10012 Router) Resets the flap-list counters for all CMs on the specified cable interface, where:</p> <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul>                                                                   |
| <b>all</b>                            | Resets the flap-list counters for all CMs or all CMs associated with a specified cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>offline</b>                        | Resets the flap-list counters for all offline CMs or for all such CMs associated with a specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>oui</b> <i>string</i>              | Resets the flap-list counters for all CMs that match the specified Organization Unique Identifier (OUI) or for all such CMs associated with a specified interface. The <i>string</i> parameter can be either the three byte hexadecimal string (such as 00.00.0C) or a vendor name that has been defined using the <b>cable modem vendor</b> command.                                                                                                                                                                                                                                                          |
| <b>reject</b>                         | Resets the flap-list counters for all CMs that are currently in one of the reject states or for all such CMs associated with a specified interface. (See the <b>show cable modem</b> command for a description of these states.)                                                                                                                                                                                                                                                                                                                                                                               |

**clear cable modem flap-counters**

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC1 | This command was introduced.                                                                                       |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** Use the **clear cable modem flap-counters** command to reset the flap-list counters associated with the **show cable flap-list** command.

This command only resets flap-list counters. To reset other cable interface counters and those counters associated with the **show cable modem counters** command, use the **clear counters** command.

**Examples** The following example shows how to reset the flap-list counters for the CM at IP address 172.16.23.45:

```
Router# clear cable modem 172.16.23.45 flap-counters
```

The following example shows how to reset the flap-list counters for all CMs that have a OUI that has been defined as having the vendor name of Cisco using the **cable modem vendor** command:

```
Router# clear cable modem oui Cisco flap-counters
```

The following example shows how to reset the flap-list counters for all CMs that are currently in one of the reject states:

```
Router# clear cable modem reject flap-counters
```

| Related Commands | Command                         | Description                                                                                                                          |
|------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>clear cable flap-list</b>    | Resets the flap-list table for a specific CM or for all CMs.                                                                         |
|                  | <b>clear cable modem delete</b> | Removes one or more CMs from the internal address and routing tables on a CMTS router and stops DOCSIS station maintenance messages. |
|                  | <b>clear cable modem lock</b>   | Resets the lock on one or more CMs.                                                                                                  |
|                  | <b>clear cable modem name</b>   | Removes or resets CMs by domain name.                                                                                                |
|                  | <b>clear cable modem reset</b>  | Removes one or more CMs from the Station Maintenance List and resets them.                                                           |
|                  | <b>clear counters</b>           | Resets interface counters and those counters associated with the <b>show cable modem counters</b> command.                           |

# clear cable modem lock

To reset the lock on one or more cable modems (CMs), and to reinitialize them so that they can reregister with a valid DOCSIS configuration file, use the **clear cable modem lock** command in privileged EXEC mode.

**clear cable modem** {*ip-addr* | *mac-addr*} **lock**

**clear cable modem** [**cable** {*slot/port* | *slot/subslot/port*} {**all** | *oui string*}] **lock**

| Syntax Description                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-addr</i>                        | Resets the lock for an individual CM by its IPv4 or IPv6 address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>mac-addr</i>                       | Resets the lock for an individual CM by its 48-bit hardware address (MAC address).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>cable</b> <i>slot/port</i>         | (Optional—Cisco uBR7100 and Cisco uBR7200 Series Routers) Resets the lock for all CMs on the specified cable interface and downstream port, where: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card.</li> <li><i>port</i>—Specifies the downstream port number.</li> </ul> Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
| <b>cable</b> <i>slot/subslot/port</i> | (Optional—Cisco uBR10012 Router) Resets the lock for all CMs on the specified cable interface, where: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul>                                                            |
| <b>all</b>                            | Resets the lock for all CMs or all CMs associated with a specified cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>oui</b> <i>string</i>              | Resets the lock for all CMs that match the specified Organization Unique Identifier (OUI) or for all such CMs associated with a specified interface. The <i>string</i> parameter can be either the three-byte hexadecimal string (such as 00.00.0C) or a vendor name that has been defined using the <b>cable modem vendor</b> command.                                                                                                                                                                                                                                            |

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced.                                                                                       |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

When you have configured the **cable dynamic-secret lock** command on a cable interface, the CMTS “locks” CMs that use a DOCSIS configuration file that fails the CMTS verification check. These CMs are allowed to come online, but with a restrictive QoS configuration that limits their service flows to 10 kbps.

Locked CMs are not allowed to reregister with a valid DOCSIS configuration file until they have been offline, without attempting to reregister, for at least 24 hours. You can manually clear the lock on a CM by using the **clear cable modem lock** command in privileged EXEC mode.

The **clear cable modem lock** command also automatically resets the CMs, so that they will reregister with the CMTS. If the CMs then reregister with a valid DOCSIS configuration file, the CMTS allows the CMs to come online with the requested QoS profiles. If the CMs violate the DOCSIS specifications again, they will be locked again.

**Note**

If a CM is not manually unlocked, it remains locked until it stays offline, without attempting to reregister, for 24 hours. It can also be unlocked by using the **clear cable modem delete** command to manually remove the CM from all of the CMTS internal databases.

**Examples**

The following example shows how to reset the lock for the CM with the MAC address of 0000.0C01.0203:

```
Router# clear cable modem 0000.0C01.0203 lock
```

The following example shows how to reset the lock for the CM at IP address 172.16.23.45:

```
Router# clear cable modem 172.16.23.45 lock
```

The following example shows how to reset the locks for all CMs that have an OUI that has been defined as having the vendor name of Cisco using the **cable modem vendor** command:

```
Router# clear cable modem oui Cisco lock
```

**Related Commands**

| Command                                | Description                                                                                                                                                                                       |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable dynamic-secret</b>            | Enables the dynamic shared secret feature, so that DOCSIS configuration files are verified with a Message Integrity Check (MIC) that has been created with a dynamically generated shared secret. |
| <b>clear cable flap-list</b>           | Resets the flap-list table for a specific CM or for all CMs.                                                                                                                                      |
| <b>clear cable modem flap-counters</b> | Resets the CM flap-list counters to zero.                                                                                                                                                         |
| <b>clear cable modem delete</b>        | Removes one or more CMs from the internal address and routing tables on a CMTS router and stops DOCSIS station maintenance messages.                                                              |



| Command                        | Description                                                                |
|--------------------------------|----------------------------------------------------------------------------|
| <b>clear cable modem name</b>  | Removes or resets CMs by domain name.                                      |
| <b>clear cable modem reset</b> | Removes one or more CMs from the Station Maintenance List and resets them. |

# clear cable modem name

To remove or reset cable modems (CMs) by domain name, use the **clear cable modem name** command in privileged EXEC mode.

**clear cable modem name** *fqdn* [**delete**]

|                    |               |                                                                                                                                                                                                                                                                               |
|--------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>fqdn</i>   | Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable Domain Name System (DNS) cache on the CMTS router. |
|                    | <b>delete</b> | Removes the CM with the specified domain name from the Station Maintenance List.                                                                                                                                                                                              |
|                    | <b>reset</b>  | Removes the CM with the specified domain name from the Station Maintenance List and resets it.                                                                                                                                                                                |

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

|                 |                |                                                                                    |
|-----------------|----------------|------------------------------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                                                |
|                 | 12.2(33)SCA    | This command was introduced.                                                       |
|                 | 12.2(33)SCD    | This command was modified to remove <b>flap-counters</b> and <b>lock</b> keywords. |

**Usage Guidelines** In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Examples** The following example shows how to delete a CM with the domain name “example”:

```
Router# clear cable modem name example delete
```

|                  |                                         |                                                                                                                                      |
|------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Related Commands | <b>Command</b>                          | <b>Description</b>                                                                                                                   |
|                  | <b>clear cable flap-list</b>            | Resets the flap-list table for a specific CM or for all CMs.                                                                         |
|                  | <b>clear cable modem flap -counters</b> | Resets the CM flap-list counters to zero.                                                                                            |
|                  | <b>clear cable modem delete</b>         | Removes one or more CMs from the internal address and routing tables on a CMTS router and stops DOCSIS station maintenance messages. |
|                  | <b>clear cable modem lock</b>           | Resets the lock on one or more CMs.                                                                                                  |

| Command                        | Description                                                                |
|--------------------------------|----------------------------------------------------------------------------|
| <b>clear cable modem reset</b> | Removes one or more CMs from the Station Maintenance List and resets them. |
| <b>show cable modem</b>        | Displays information for the registered and unregistered CMs.              |

# clear cable modem rcs-counts

To clear the following failure and recovery event counts for all or given RF channels of a CM, use the **clear cable modem rcs-counts** command in privileged EXEC mode:

- MAC Domain Descriptor (MDD)
- QAM/forward error correction (FEC)

**clear cable modem** [**cable if** | **mac\_addr** | **ip\_addr**] **rcs-counts** [**modular-cable slot/bay/port nb-channel-number**]

| Syntax Description       |                                                                                                                                                                          |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable if</b>          | (Optional) The name of the downstream interface.                                                                                                                         |
| <b>mac-address</b>       | (Optional) Identifies the MAC address of a CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.        |
| <b>ip-address</b>        | (Optional) Identifies the IP address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed. |
| <i>slot</i>              | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs.                                                                          |
| <i>bay</i>               | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).                                                                               |
| <i>port</i>              | Specifies the interface number on the SPA.                                                                                                                               |
| <i>nb-channel-number</i> | Represents the narrowband channel number.                                                                                                                                |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

| Related Commands | Command                         | Description                                                                                                                          |
|------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>clear cable flap-list</b>    | Resets the flap-list table for a specific CM or for all CMs.                                                                         |
|                  | <b>clear cable modem delete</b> | Removes one or more CMs from the internal address and routing tables on a CMTS router and stops DOCSIS station maintenance messages. |
|                  | <b>clear cable modem lock</b>   | Resets the lock on one or more CMs.                                                                                                  |

| Command                        | Description                                                                |
|--------------------------------|----------------------------------------------------------------------------|
| <b>clear cable modem name</b>  | Removes or resets CMs by domain name.                                      |
| <b>clear cable modem reset</b> | Removes one or more CMs from the Station Maintenance List and resets them. |

# clear cable modem reset

To remove one or more cable modems (CMs) from the Station Maintenance List and reset them, use the **clear cable modem reset** command in privileged EXEC mode.

**clear cable modem** {*ip-addr* | *mac-addr*} **reset**

**clear cable modem** [**cable** {*slot/port* | *slot/subslot/port*}] [**all** | **non-bonding-capable** [**legacy-ranging**] | **oui** *string* | **reject** | **wideband** [**registered-traditional-docsis**]] **reset**

| Syntax Description                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-addr</i>                        | Specifies removal of an individual CM by its IPv4 or IPv6 address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>mac-addr</i>                       | Specifies removal of an individual CM by its 48-bit hardware address (MAC address).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>cable</b> <i>slot/port</i>         | (Optional—Cisco uBR7100 and Cisco uBR7200 Series Routers) Specifies removal of all CMs on the specified cable interface and downstream port, where: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card.</li> <li><i>port</i>—Specifies the downstream port number.</li> </ul> Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
| <b>cable</b> <i>slot/subslot/port</i> | (Optional—Cisco uBR10012 Router) Specifies removal of all CMs on the specified cable interface, where: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul>                                                            |
| <b>all</b>                            | Specifies removal of all CMs or all CMs associated with a specified cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>non-bonding-capable</b>            | Specifies removal of all narrowband CMs that are not capable of downstream channel bonding or all such CMs associated with a specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>legacy-ranging</b>                 | (Optional) Specifies removal of narrowband CMs that are accessed with legacy initial ranging or all such CMs associated with a specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>oui</b> <i>string</i>              | Specifies removal of all CMs that match the specified Organization Unique Identifier (OUI) or all such CMs associated with a specified interface. The <i>string</i> parameter can be either the three-byte hexadecimal string (such as 00.00.0C) or a vendor name that has been defined using the <b>cable modem vendor</b> command.                                                                                                                                                                                                                                                |

|                                      |                                                                                                                                                                                                                 |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>reject</b>                        | Specifies removal of all CMs that are currently in one of the reject states or all such CMs associated with a specified interface. (See the <b>show cable modem</b> command for a description of these states.) |
| <b>wideband</b>                      | Specifies removal of all wideband CMs or all such CMs associated with a specified interface.                                                                                                                    |
| <b>registered-traditional-docsis</b> | (Optional) Specifies removal of all wideband CMs that are registered as traditional DOCSIS CMs or all such CMs associated with a specified interface.                                                           |

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                  |
|------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.1(2) EC     | This command was introduced.                                                                                                                                                                                                                                         |
|                        | 12.2(4)BC1     | Support was added to the Release 12.2 BC train.                                                                                                                                                                                                                      |
|                        | 12.2(11)BC2    | Support was added for the <b>oui</b> and <b>reject</b> options.                                                                                                                                                                                                      |
|                        | 12.2(15)BC1    | The <b>cable</b> keyword option was added.                                                                                                                                                                                                                           |
|                        | 12.3(21)BC     | Support was added for the <b>wideband</b> and <b>registered-traditional-docsis</b> keyword options.                                                                                                                                                                  |
|                        | 12.3(23)BC     | Support was added for the <b>non-bonding-capable</b> and <b>legacy-ranging</b> keyword options.                                                                                                                                                                      |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM was added.</li> </ul> |

**Usage Guidelines** This command instructs the Cisco CMTS to stop sending DOCSIS station maintenance messages to one or more CMs, which effectively terminates the link to those CMs until those CMs time out and reattempt initial ranging. A CM responds to this by resetting itself. Depending on when the CM received the last station maintenance message, it can take up to 30 seconds before the CM detects the missing station maintenance messages and resets itself.

If the **clear cable modem** {*ip-address* | *mac-address*} **reset** form of the command is used to reset an individual modem, the CMTS router sends a ranging abort message to the specified modem in order to command the modem to reset itself and begin initial ranging more quickly without having to wait for up to 30 seconds to realize it is no longer receiving station maintenance keep-alive opportunities. This behavior is only seen when using the **clear cable modem reset** command for a specific CM.



**Tip**

You can also specify the MAC address or IP address for a CPE device or host, and the Cisco CMTS resets the CM that is associated with that CPE device in its internal database.

In some circumstances, the customer premises equipment (CPE) device behind a CM stops receiving traffic after the CM is reset. This is because the CMTS still has the CPE device listed in its address tables, but the CM does not after being reset, so the traffic passes through the CMTS but is dropped by the CM. To resolve this situation, the CPE device should simply send some type of traffic to the CM, such as a ping packet. (You can also resolve this situation by using the **clear arp-cache** command on the Cisco CMTS router to clear the router's address table, but this is not recommended because it temporarily interrupts all traffic on the router.)

**Caution**

The **clear cable modem all reset** command should normally be used only on a test or lab network. If used on a large network, it could impact service for a significant period of time, as it would force all CMs to simultaneously reset and reregister with the Cisco CMTS.

**Note**

The **clear cable modem all reset** command can result in the CPU utilization temporarily reaching 100 percent for a couple of minutes, as the CPU processes the command for all CMs. The CPU utilization will return to normal within a couple of minutes.

**Examples**

The following example shows how to reset the CM at IP address 172.23.45.67:

```
Router# clear cable modem 172.23.45.67 reset
```

The following example shows how to reset all CMs that have an OUI that has been defined as having the vendor name of Cisco using the **cable modem vendor** command:

```
Router# clear cable modem oui Cisco reset
```

The following example shows how to reset all CMs that are currently in one of the reject states:

```
Router# clear cable modem reject reset
```

For the Cisco uBR10012 router, the following example shows how to reset all wideband CMs that are registered as traditional DOCSIS modems:

```
Router# clear cable modem wideband registered-traditional-docsis reset
```

**Related Commands**

| Command                                | Description                                                                                                                          |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>clear cable flap-list</b>           | Resets the flap-list table for a specific CM or for all CMs.                                                                         |
| <b>clear cable modem flap-counters</b> | Resets the CM flap-list counters to zero.                                                                                            |
| <b>clear cable modem delete</b>        | Removes one or more CMs from the internal address and routing tables on a CMTS router and stops DOCSIS station maintenance messages. |
| <b>clear cable modem lock</b>          | Resets the lock on one or more CMs.                                                                                                  |
| <b>clear cable modem name</b>          | Removes or resets CMs by domain name.                                                                                                |
| <b>show cable modem</b>                | Displays information for registered and unregistered CMs.                                                                            |



# clear cable modem rf-adapt

To clear RF adaptation candidates or history information of the cable modems, use the **clear cable modem rf-adapt** command in privileged EXEC mode.

```
clear cable modem {ip-addr | mac-addr | [cable {slot/cable-interface-index |
slot/subslot/cable-interface-index}] {all | offline | reject | oui string}} rf-adapt {candidates
[downgrade | upgrade] | history}
```

| Syntax Description |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-addr</i>     | IPv4 or IPv6 address of the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>mac-addr</i>    | 48-bit MAC address of the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>cable</b>       | Specifies the cable interface line card details. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the cable interface line card resides.</li> <li><i>subslot</i>—(Cisco uBR10012 only) Secondary slot number of the cable interface line card.</li> <li><i>cable-interface-index</i>—Downstream port number or MAC domain index of the cable interface line card.</li> </ul> <p><a href="#">Table 26</a> displays the valid values for these arguments.</p> |
| <b>all</b>         | Clears the RF adaptation history or candidate status of all cable modems.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>offline</b>     | Clears the RF adaptation history or candidate status of all offline cable modems.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>reject</b>      | Clears the RF adaptation history or candidate status of all cable modems in reject state.                                                                                                                                                                                                                                                                                                                                                                                |
| <b>oui string</b>  | Clears the RF adaptation history or candidate status of the cable modems that match the specified Organization Unique Identifier (OUI) or for all cable modems associated with a specified interface. The <i>string</i> parameter can be either the three byte hexadecimal string (such as 00.00.0C) or a vendor name that has been defined using the <b>cable modem vendor</b> command.                                                                                 |
| <b>candidates</b>  | Clears RF adaptation candidates.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>downgrade</b>   | (Optional) Clears RF adaptation downgrade candidates.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>upgrade</b>     | (Optional) Clears RF adaptation upgrade candidates.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>history</b>     | Clears RF adaptation history.                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Command Default** None

**Command Modes** Privileged EXEC (#)

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.2(33)SCF3 | This command was introduced. |

**Usage Guidelines**

Use the **clear cable modem rf-adapt history** command to remove the history of all RF adaptation relocations for a given cable modem.

Use the **clear cable modem rf-adapt candidates** command to change the status of a cable modem or group of cable modems that are RF adaptation relocation candidates.

Using the **clear cable modem rf-adapt history** and **clear cable modem rf-adapt candidates** commands do not affect the MAC state of the cable modem.

[Table 26](#) displays the interface density information.

**Table 26** *Interface Density Information*

| CMTS Router      | Line Card          | Slot   | Subslot | Port   | Cable Interface Index |
|------------------|--------------------|--------|---------|--------|-----------------------|
| Cisco uBR10012   | Cisco uBR-MC3GX60V | 5 to 8 | 0 or 1  | 0 or 4 | 0 to 14               |
|                  | Cisco UBR-MC20X20V |        |         |        | 0 to 4                |
|                  | Cisco uBR10-MC5X20 |        |         |        |                       |
| Cisco uBR7225VXR | All                | 1 or 2 | 0 or 1  | 0 or 1 | —                     |
| Cisco uBR7246VXR | All                | 3 to 6 | 0 or 1  | 0 or 1 | —                     |

**Examples**

The following example shows how to reset the RF adaptation history for the cable modem at IP address 192.0.2.255:

```
Router# clear cable modem 192.0.2.255 rf-adapt history
```

The following example shows how to reset the RF adaptation downgrade candidates for all cable modems:

```
Router# clear cable modem all rf-adapt candidates downgrade
```

**Associated Features**

The **clear cable modem rf-adapt** command is used to configure the [Cable Modem Upstream RF Adaptation](#) feature.

**Related Commands**

| Command                          | Description                                                             |
|----------------------------------|-------------------------------------------------------------------------|
| <b>show cable modem rf-adapt</b> | Displays the RF adaptation history.                                     |
| <b>show cable rf-adapt</b>       | Displays RF adaptation information of upgrade and downgrade candidates. |

# clear cable modem service-type-id

To clear the cable modem service type id, use the **clear cable modem service-type-id** command in privileged EXEC mode.

**clear cable modem** {*ip* | *mac* | **name** *domain name* | [*interface*] } {**all** | **offline** | **oui** *oui* | **reject** | **wideband** | **none-bounding-capable** } **service-type-id**

| Syntax Description             |  |                                                                                                                                                                                                                                                             |
|--------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip</i>                      |  | Specifies removal of an individual CM by its IPv4 or IPv6 address.                                                                                                                                                                                          |
| <i>mac</i>                     |  | Specifies removal of an individual CM by its 48-bit hardware address (MAC address).                                                                                                                                                                         |
| <b>name</b> <i>domain name</i> |  | Specifies the domain name of the cable modem.                                                                                                                                                                                                               |
| <i>interface</i>               |  | (Optional) Resets the attribute masks of the offline CMs.                                                                                                                                                                                                   |
| <b>all</b>                     |  | Specifies removal of all CMs or all CMs associated with a specified cable interface.                                                                                                                                                                        |
| <b>offline</b>                 |  | Specifies removal of all offline CMs or all such CMs associated with a specified interface.                                                                                                                                                                 |
| <b>oui</b> <i>oui</i>          |  | Specifies removal of all CMs that match the specified Organization Unique Identifier (OUI) or all such CMs associated with a specified interface. The string parameter can be either the three-byte hexadecimal string (such as 00.00.0C) or a vendor name. |
| <b>reject</b>                  |  | Specifies removal of all CMs that are currently in one of the reject states or all such CMs associated with a specified interface.                                                                                                                          |
| <b>wideband</b>                |  | Specifies removal of all wideband CMs or all such CMs associated with a specified interface.                                                                                                                                                                |
| <b>none-bounding-capable</b>   |  | Specifies removal of all narrowband CMs that are not capable of downstream channel bonding or all such CMs associated with a specified interface.                                                                                                           |
| <b>service-type-id</b>         |  | Specifies the service type identifier.                                                                                                                                                                                                                      |

**Command Default** No default behavior or values for this command

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Usage Guidelines** This command clears the CM's service type id.

**Examples** The following example shows how to clear cable modem service type id:

```
Router# clear cable modem all service-type-id
```

**clear cable modem service-type-id**

```
Router# clear cable modem oui SA service-type-id
Router# clear cable modem c5/0/0 offline service-type-id
```

**Related Commands**

| Command                                  | Description                                          |
|------------------------------------------|------------------------------------------------------|
| <b>clear cable modem attribute-masks</b> | This command clears the cable modem attribute masks. |
| <b>show cable modem service-type-id</b>  | Displays the modems having service type id.          |

# clear cable modem voice

To clear the voice tag that is set for a cable modem (CM), use the **clear cable modem voice** command in privileged EXEC mode.

```
clear cable modem {ip-addr | mac-addr} voice {retries | tag}
```

```
clear cable modem [cable slot/subslot/port] {all | offline | oui string | reject} voice{retries | tag}
```

## Syntax Description

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-addr</i>                 | Specifies removal of an individual CM by its IPv4 or IPv6 address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>mac-addr</i>                | Specifies removal of an individual CM by its 48-bit hardware address (MAC address).                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>retries</b>                 | Clears the CM downstream retries record.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>tag</b>                     | Clears the CM voice tag.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>cable slot/subslot/port</b> | (Optional—Cisco uBR10012 Router) Specifies clearing of voice tags for CMs on the specified cable interface, where: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul> |
| <b>all</b>                     | Specifies clearing of voice tags for all CMs or all CMs associated with a specified cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>offline</b>                 | Specifies clearing of voice tags for all offline CMs or all such CMs associated with a specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>oui string</b>              | Specifies clearing of voice tags for all CMs that match the specified Organization Unique Identifier (OUI) or all such CMs associated with a specified interface. The <i>string</i> parameter can be either the three byte hexadecimal string (such as 00.00.0C) or a vendor name that has been defined using the <b>cable modem vendor</b> command.                                                                                                                                                                                 |
| <b>reject</b>                  | Specifies clearing of voice tags for all CMs that are currently in one of the reject states or all such CMs associated with a specified interface. (See the <b>show cable modem</b> command for a description of these states).                                                                                                                                                                                                                                                                                                      |

## Command Default

No default behavior or values

## Command Modes

Privileged EXEC (#)

## Command History

| Release    | Modification                                               |
|------------|------------------------------------------------------------|
| 12.3(23)BC | This command was introduced for the Cisco uBR10012 router. |

**clear cable modem voice****Examples**

The following example shows how to clear the voice tag and retries record for the CM at IP address 172.16.23.45:

```
Router# clear cable modem 172.16.23.45 voice retries
```

**Related Commands**

| Commands                      | Description                                                |
|-------------------------------|------------------------------------------------------------|
| <b>show cable modem voice</b> | Displays the detected voice-enabled modems.                |
| <b>test cable voice</b>       | Allows you to manually set the voice tag of a cable modem. |

# clear cable multicast ses-cache

To clear the multicast replication sessions cache, use the **clear cable ses-cache** command in privileged EXEC mode.

```
clear cable multicast ses-cache {all | counter | interface
integrated-cable slot/subslot/port:rf-channel |
modular-cable slot/{subslot | bay}/port:interface-number |
wideband-cable slot/{subslot | bay}/port:wideband-channel}
```

| Syntax Description                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>                                                                                     | Clears the cached multicast replication sessions for all interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>counter</b>                                                                                 | Clears multicast replication sessions cache counters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>interface</b><br><b>integrated-cable</b><br><i>slot/subslot/port:rf-channel</i>             | <p>Clears the cached multicast replication sessions for a integrated-cable interface.</p> <ul style="list-style-type: none"> <li><i>slot</i>—Slot where a line card resides.</li> <li><i>subslot</i>—(Cisco uBR10012 only) Secondary slot number of a line card.</li> <li><i>port</i>—Downstream port number.</li> <li><i>rf:channel</i>—RF channel number.</li> </ul> <p><a href="#">Table 27</a> displays valid values for these arguments.</p>                                                                                                          |
| <b>interface</b><br><b>modular-cable</b><br><i>slot/{subslot   bay}/port:interface-number</i>  | <p>Clears the cached multicast replication sessions for a modular-cable interface.</p> <ul style="list-style-type: none"> <li><i>slot</i>—Slot where a SPA interface processor (SIP) or a line card resides.</li> <li><i>subslot</i>—Secondary slot for a shared port adapter (SPA) or a line card.</li> <li><i>bay</i>—Bay in a SIP where a SPA is located.</li> <li><i>port</i>—Downstream port number.</li> <li><i>interface-number</i>—Modular channel number.</li> </ul> <p><a href="#">Table 28</a> displays valid values for these arguments.</p>   |
| <b>interface</b><br><b>wideband-cable</b><br><i>slot/{subslot   bay}/port:wideband-channel</i> | <p>Clears the cached multicast replication sessions for a wideband-cable interface.</p> <ul style="list-style-type: none"> <li><i>slot</i>—Slot where a SPA interface processor (SIP) or a line card resides.</li> <li><i>subslot</i>—Secondary slot for a shared port adapter (SPA) or a line card.</li> <li><i>bay</i>—Bay in a SIP where a SPA is located.</li> <li><i>port</i>—Downstream port number.</li> <li><i>wideband-channel</i>—Wideband channel number.</li> </ul> <p><a href="#">Table 29</a> displays valid values for these arguments.</p> |

**Command Modes** Privileged EXEC (#)

**Command History**

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCH | This command was introduced. |

**Usage Guidelines**

Use the **clear cable multicast ses-cache** command to clear the multicast replication sessions configured on the interfaces.

[Table 27](#) displays the valid values for an integrated-cable interface.

**Table 27 Integrated Cable Interface Density Information**

| CMTS Router      | Line Card          | Slot   | Subslot | Port   | RF Channel Number |
|------------------|--------------------|--------|---------|--------|-------------------|
| Cisco uBR10012   | Cisco uBR-MC3GX60V | 5 to 8 | 0 or 1  | 0 to 4 | 0 to 3            |
|                  | Cisco UBR-MC20X20V |        |         |        |                   |
|                  | Cisco uBR10-MC5X20 |        |         |        |                   |
| Cisco uBR7225VXR | All                | 1 or 2 | —       | 0 or 1 | —                 |
| Cisco uBR7246VXR | All                | 3 to 6 | —       | 0 or 1 | —                 |

[Table 28](#) displays the valid values for an modular-cable interface.

**Table 28 Modular Cable Interface Density Information**

| Line Card                             | Slot   | Subslot             | Bay    | Port   | Interface Number |
|---------------------------------------|--------|---------------------|--------|--------|------------------|
| Cisco uBR-MC3GX60V                    | 5 to 8 | 0 or 1              | —      | 0 to 2 | 0 to 23          |
| Cisco UBR-MC20X20V                    |        |                     | —      | 0 to 5 |                  |
| Cisco Wideband SPA                    | —      | 0 or 1 <sup>1</sup> | 0 to 3 | 0      |                  |
| Cisco Wideband SIP /<br>Cisco SIP-600 | 1 or 3 | —                   | —      | —      |                  |

1. Applicable to SPAs when the SIP is in Slot1 or Slot 3. The subslot is not specified from Cisco IOS Release 12.2(33)SCB onwards.

[Table 29](#) displays the valid values for an wideband-cable interface.

**Table 29 Wideband Interface Density Information**

| CMTS Router    | Line Card                             | Slot   | Subslot             | Bay    | Port   | Wideband Channel |
|----------------|---------------------------------------|--------|---------------------|--------|--------|------------------|
| Cisco uBR10012 | Cisco uBR-MC3GX60V                    | 5 to 8 | 0 or 1              | —      | 0 to 4 | 0 to 31          |
|                | Cisco UBR-MC20X20V                    |        |                     | —      |        | 0 to 5           |
|                | Cisco uBR10-MC5X20                    |        |                     | —      |        | —                |
|                | Cisco Wideband SPA                    | —      | 0 or 1 <sup>1</sup> | 0 to 3 | 0      | —                |
|                | Cisco Wideband SIP /<br>Cisco SIP-600 | 1 or 3 | —                   | —      | —      | —                |



**Table 29**      **Wideband Interface Density Information**

| CMTS Router      | Line Card | Slot   | Subslot | Bay | Port   | Wideband Channel |
|------------------|-----------|--------|---------|-----|--------|------------------|
| Cisco uBR7225VXR | All       | 1 to 2 | —       | —   | 0 or 1 | 0 to 5           |
| Cisco uBR7246VXR | All       | 3 to 6 | —       | —   |        |                  |

1. Applicable to SPAs when the SIP is in Slot1 or Slot 3. The subslot is not specified from Cisco IOS Release 12.2(33)SCB onwards.

**Examples**

The following example clears the multicast replication session cache for all interfaces on the Cisco uBR10012 router:

```
Router# clear cable multicast ses-cache all
```

**Related Commands**

| Command                               | Description                                                                                                                      |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>cable multicast ses-cache</b>      | Configures the multicast replication session cache on the Cisco uBR10012 router.                                                 |
| <b>show cable multicast ses-cache</b> | Displays the multicast replication session cache information both at the global and interface level of the forwarding interface. |

# clear cable multicast statistics counter

To reset all multicast statistics counters, use the **clear cable multicast statistics counter** command in privileged EXEC mode.

**clear cable multicast statistics counter**

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

**Usage Guidelines** The counters are also set to zero when a given multicast resource is reconfigured. Counters are displayed using the **show cable multicast statistics** command.

**Examples** The following example shows how to reset configured multicast statistics index allocation details to zero:

```
Router# clear cable multicast statistics counter
Router#
```

| Related Commands | Command                                | Description                                                        |
|------------------|----------------------------------------|--------------------------------------------------------------------|
|                  | <b>show cable multicast statistics</b> | Displays the multicast statistics index allocation details.        |
|                  | <b>show cable multicast db</b>         | Displays the contents of the multicast explicit tracking database. |

# clear cable rf-status

To reset flap counts and flap time for all or a given RF channel, use the **clear cable rf-status** command in privileged EXEC mode.

**clear cable rf-status** [**modular-cable** *slot/bay/port nb-channel-number*]

|                           |                          |                                                                                                 |
|---------------------------|--------------------------|-------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>slot</i>              | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
|                           | <i>bay</i>               | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
|                           | <i>port</i>              | Specifies the interface number on the SPA.                                                      |
|                           | <i>nb-channel-number</i> | Represents the narrowband channel number.                                                       |

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCB    | This command was introduced. |

|                         |                                 |                                                                                                                                      |
|-------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>                  | <b>Description</b>                                                                                                                   |
|                         | <b>clear cable flap-list</b>    | Resets the flap-list table for a specific CM or for all CMs.                                                                         |
|                         | <b>clear cable modem delete</b> | Removes one or more CMs from the internal address and routing tables on a CMTS router and stops DOCSIS station maintenance messages. |
|                         | <b>clear cable modem lock</b>   | Resets the lock on one or more CMs.                                                                                                  |
|                         | <b>clear cable modem name</b>   | Removes or resets CMs by domain name.                                                                                                |
|                         | <b>clear cable modem reset</b>  | Removes one or more CMs from the Station Maintenance List and resets them.                                                           |

# clear cable secondary-ip

To clear the router’s table that links secondary IP addresses to the devices that use them, use the **clear cable secondary-ip** command in privileged EXEC mode.

```
clear cable secondary-ip interface cable {slot/port | slot/subport/port}[all | sid sid [ip-address]]
```

|                    |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | slot/port         | (Cisco uBR7100 and Cisco uBR7200 Series Routers) Specifies the cable interface and downstream port, where: <ul style="list-style-type: none"><li>slot—Specifies the chassis slot number of the cable interface line card.</li><li>port—Specifies the downstream port number.</li></ul> Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
|                    | slot/subslot/port | Cisco uBR10012 Router) Specifies the cable interface, where: <ul style="list-style-type: none"><li>slot—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li><li>subslot—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li><li>port—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li></ul>                                                                     |
|                    | all               | Specifies that all IP addresses in the secondary IP address table should be cleared.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                    | sid sid           | Specifies that all IP addresses for a particular Service ID (SID) should be cleared. The valid range is 1 to 8191.                                                                                                                                                                                                                                                                                                                                                                                                        |
|                    | ip-address        | (Optional) Specifies that the IP address for a particular CM or CPE device should be cleared.                                                                                                                                                                                                                                                                                                                                                                                                                             |

Command Default No default behavior or values

Command Modes Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                   |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------|
|                 | 12.1(13)EC  | This command was introduced for the Cisco uBR7100 series and Cisco uBR7200 series universal broadband routers. |
|                 | 12.2(11)BC1 | Support was added for the Cisco uBR10012 universal broadband router.                                           |
|                 | 12.2(11)BC2 | This command was removed because it is no longer needed, because of database changes.                          |

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

### Usage Guidelines

To support BPI and BPI+ operations with CMs and CPE devices that use secondary IP addresses, the CMTS maintains a database that links the known secondary IP addresses to the SIDs used by those devices. When the CMTS and CM need to renew their public keys, the CMTS uses this database to ensure that all IP addresses are sufficiently updated to allow proper routing and fast switching.



#### Tip

You can display the list of known IP addresses per SID by using the **show interface cable sid** command.

If you encounter apparent problems with secondary IP addressing, or if you want to manually clear the table of IP addresses for a particular SID, use the **clear cable secondary-ip** command.



#### Tip

One possible situation that might occur is if a CM first assigns a secondary IP address to one CPE device, but later that same IP address is assigned to another CPE device behind a different CM. If this happens, the IP address will continue to show up as a secondary IP address for the original CM until that CM renews its public keys. This will not affect network connectivity for either CPE or CM. You can, however, clear the unneeded secondary IP address from the CMTS database using the **clear cable secondary-ip** command.

### Examples

The following example shows how to clear all of the secondary IP addresses for a particular cable interface:

```
Router# clear cable secondary-ip interface cable 3/0 all
```

The following example shows how to clear the secondary IP addresses for all CM and CPE devices on cable interface 1/0 that are using SID 5:

```
Router# clear cable secondary-ip interface cable 1/0 sid 5
```

The following example shows how to clear the secondary IP addresses for the CM and CPE devices on cable interface 5/0 that are using SID 113 and IP address 10.10.17.3:

```
Router# clear cable secondary-ip interface cable 5/0 sid 113 10.10.17.3
```

### Related Commands

| Command                         | Description                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------|
| <b>show interface cable sid</b> | Displays information for a particular SID, including the known secondary IP addresses. |

# clear cable modem service-type-id

To clear the cable modem service type id, use the **clear cable modem service-type-id** command in privileged EXEC mode.

**clear cable modem** {*ip* | *mac* | **name** *domain name* | [*interface*] } **{all | offline | oui** *oui* | **reject | wideband | none-bounding-capable** } **service-type-id**

| Syntax Description             |  |                                                                                                                                                                                                                                                             |
|--------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip</i>                      |  | Specifies removal of an individual CM by its IPv4 or IPv6 address.                                                                                                                                                                                          |
| <i>mac</i>                     |  | Specifies removal of an individual CM by its 48-bit hardware address (MAC address).                                                                                                                                                                         |
| <b>name</b> <i>domain name</i> |  | Specifies the domain name of the cable modem.                                                                                                                                                                                                               |
| <i>interface</i>               |  | (Optional) Resets the attribute masks of the offline CMs.                                                                                                                                                                                                   |
| <b>all</b>                     |  | Specifies removal of all CMs or all CMs associated with a specified cable interface.                                                                                                                                                                        |
| <b>offline</b>                 |  | Specifies removal of all offline CMs or all such CMs associated with a specified interface.                                                                                                                                                                 |
| <b>oui</b> <i>oui</i>          |  | Specifies removal of all CMs that match the specified Organization Unique Identifier (OUI) or all such CMs associated with a specified interface. The string parameter can be either the three-byte hexadecimal string (such as 00.00.0C) or a vendor name. |
| <b>reject</b>                  |  | Specifies removal of all CMs that are currently in one of the reject states or all such CMs associated with a specified interface.                                                                                                                          |
| <b>wideband</b>                |  | Specifies removal of all wideband CMs or all such CMs associated with a specified interface.                                                                                                                                                                |
| <b>none-bounding-capable</b>   |  | Specifies removal of all narrowband CMs that are not capable of downstream channel bonding or all such CMs associated with a specified interface.                                                                                                           |
| <b>service-type-id</b>         |  | Specifies the service type identifier.                                                                                                                                                                                                                      |

**Command Default** No default behavior or values for this command

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Usage Guidelines** This command clears the CM's service type id.

**Examples** The following example shows how to clear cable modem service type id:

```
Router# clear cable modem all service-type-id
```

```
Router# clear cable modem oui SA service-type-id
Router# clear cable modem c5/0/0 offline service-type-id
```

**Related Commands**

| Command                                  | Description                                          |
|------------------------------------------|------------------------------------------------------|
| <b>clear cable modem attribute-masks</b> | This command clears the cable modem attribute masks. |
| <b>show cable modem service-type-id</b>  | Displays the modems having service type id.          |

# clear facility-alarm

To clear alarm conditions and reset the alarm contacts, use the **clear facility-alarm** command in privileged EXEC mode.

**clear facility-alarm** [**critical** | **major** | **minor** | **source pem** {**0** | **1**}]

## Syntax Description

|                                           |                                                                                                           |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>critical</b>                           | (Optional) Clears all critical alarms.                                                                    |
| <b>major</b>                              | (Optional) Clears all major alarms.                                                                       |
| <b>minor</b>                              | (Optional) Clears all minor alarms.                                                                       |
| <b>source pem</b> { <b>0</b>   <b>1</b> } | (Optional—Cisco uBR10012 only) Clears all alarms for either the first or second Power Entry Module (PEM). |

## Defaults

If specified without any options, clears all facility alarms.

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                               |
|-------------|----------------------------------------------------------------------------|
| 12.0(17)SL  | This command was introduced on the Cisco 10000 series router.              |
| 12.2(1)XF1  | This command was introduced for the Cisco uBR10012 router.                 |
| 12.2(16)BX  | This command was introduced on the PRE2.                                   |
| 12.2(31)SB2 | This command was introduced on the PRE3 for the Cisco 10000 series router. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                 |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.            |

## Usage Guidelines

The **clear facility-alarm** command clears the contacts to an external alarm panel. Only a reoccurrence of the original alarm source after the original alarm condition is removed can restart the audible alarm. These alarms are displayed by the **show facility-alarm status** command.

The alarm LEDs remain lit on the Performance Routing Engine (PRE) as long as the alarm condition continues and is not cleared by the **clear facility-alarm** command. An alarm can only be removed from the list by correcting the issue that is triggering the alarm.

## Examples

The following example shows how to clear all facility alarms on the router:

```
Router# clear facility-alarm
Clearing all alarms
```

The following example shows how to clear all critical facility alarms on the router:

```
Router# clear facility-alarm critical
Clearing critical alarms
```



The following example shows how to clear minor facility alarms only:

```
Router# clear facility-alarm minor
Clearing minor alarms
```

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The following example shows how to clear all alarms for both PEM modules on a Cisco uBR10012 universal broadband router:

```
Router# clear facility-alarm source pem 0
Router# clear facility-alarm source pem 1
```

#### Related Commands

| Command                           | Description                                                                                                                               |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>facility-alarm</b>             | Sets the temperature thresholds at which the processor generates a critical, major, or minor alarm to warn of potential equipment damage. |
| <b>show facility-alarm status</b> | Displays the current temperature thresholds that will trigger a facility alarm.                                                           |

# clear hccp counters

To reset the counters for one or all Hot Standby Connection-to-Connection Protocol (HCCP) groups, use the **clear hccp counters** command in privileged EXEC mode.

**clear hccp** [*group* | **all**] **counters**

## Syntax Description

|              |                                                                                  |
|--------------|----------------------------------------------------------------------------------|
| <i>group</i> | Clears the counters for the specified group number. The valid range is 1 to 255. |
| <b>all</b>   | Clears the counters for all HCCP groups.                                         |

## Command Default

No default behavior or values.

## Command Modes

Privileged EXEC (#)

## Command History

| Release                   | Modification                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
| 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
| 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |
| 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                                                                                                  |

## Usage Guidelines

This command clears the counters that are displayed by the **show hccp** and **show hccp interface** commands. You can clear the counters for a single HCCP group, or all HCCP groups.

## Examples

The following example shows the counters for group 1 being reset to 0:

```
Router# clear hccp 1 counters
```

The following example shows the counters for all groups being reset to 0:

```
Router# clear hccp all counters
```

**Related Commands**

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp working</b>        | Designates a cable interface on a CMTS in the specified group to be a Working CMTS.                                                  |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# clear hccp linecard

To clear information about the Hot Standby Connection-to-Connection Protocol (HCCP) startup and switchover flow and unused events associated with cable line cards, use the **clear hccp linecard** command in privileged EXEC mode.

**clear hccp linecard { fsm | nullfsm } buffer**

|                           |                                                                                                                                                                                                                         |                                                                                                                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>fsm</b>                                                                                                                                                                                                              | The HCCP state transition flow (startup and switchover flow). Each line card member in an HCCP group is controlled by a state machine, which controls the HCCP startup and switchover flow. |
|                           | <b>nullfsm</b>                                                                                                                                                                                                          | The HCCP members that received unused or redundant events. This option is used only for debugging.                                                                                          |
|                           | <b>buffer</b>                                                                                                                                                                                                           | Buffer for saving HCCP state transition flow.                                                                                                                                               |
| <b>Command Default</b>    | None                                                                                                                                                                                                                    |                                                                                                                                                                                             |
| <b>Command Modes</b>      | Privileged EXEC (#)                                                                                                                                                                                                     |                                                                                                                                                                                             |
| <b>Command History</b>    | <b>Release</b>                                                                                                                                                                                                          | <b>Modification</b>                                                                                                                                                                         |
|                           | 12.2(33)SCE                                                                                                                                                                                                             | This command was introduced.                                                                                                                                                                |
| <b>Examples</b>           | <p>The following example shows how to clear entries for the HCCP startup and switchover flow using the <b>clear hccp linecard</b> command on a Cisco CMTS router:</p> <pre>Router# clear hccp linecard fsm buffer</pre> |                                                                                                                                                                                             |
| <b>Related Commands</b>   | <b>Command</b>                                                                                                                                                                                                          | <b>Description</b>                                                                                                                                                                          |
|                           | <b>show hccp interface</b>                                                                                                                                                                                              | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured.                                                        |
|                           | <b>show hccp linecard</b>                                                                                                                                                                                               | Displays line card level HCCP group information.                                                                                                                                            |

# clear packetcable rks

To clear the record keeping server (RKS) entries when there are no calls associated with the RKS server, use the **clear packetcable rks** command in privileged EXEC mode.

```
clear packetcable rks {ip_addr ip_addr {port} | all}
```

## Syntax Description

|                               |                                                                   |
|-------------------------------|-------------------------------------------------------------------|
| <b>ip_addr</b> <i>ip_addr</i> | Indicates the IP address of the RKS server to be cleared.         |
| <i>port</i>                   | Indicates the UDP port of the RKS server to be cleared.           |
| <b>all</b>                    | Indicates that information about all RKS servers will be cleared. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCD | This command was introduced. |

## Usage Guidelines

The **clear packetcable rks** command is used to clear the unwanted IP addresses of the RKS servers from the RKS server group list.



### Note

This command clears the IP addresses of only those RKS servers that are currently not being used. In other words, if the reference count of an RKS server is a non-zero value, that entry will not be cleared from the RKS server group list.



### Tip

You can verify the value of reference count (ref-cnt) by executing the **show packetcable event** command with the **rks-group** keyword.

## Examples

The following sample shows how to clear the RKS server with IP address 2.39.26.8 on port 1816:

```
router# clear packetcable rks ip_addr 2.39.26.8 1816
```

The following sample shows how to clear the entries of all RKS servers:

```
router# clear packetcable rks all
```

## Related Commands

| Command                       | Description                                                                                                     |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>show packetcable event</b> | Displays information about the servers that are configured on the Cisco CMTS router for PacketCable operations. |

# clear packetcable gate counter commit

To clear the specified gate counter for PacketCable Multimedia (PCMM) or Dynamic Quality of Service (DQoS) for PC, use the **clear packetcable gate counter commit** command in Privileged EXEC mode.

**clear packetcable gate counter commit [dqos | multimedia]**

## Syntax Description

|                   |                               |
|-------------------|-------------------------------|
| <b>dqos</b>       | Clears PC DQoS gate counters. |
| <b>multimedia</b> | Clears PCMM gate counters.    |

## Command Default

The committed gate counter is reset to zero by default with router restart, and gates are not cleared periodically by default.

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(8)BC2  | This command was introduced for the Cisco uBR7200 series universal broadband router.                                                                               |
| 12.2(15)BC1 | Support was added for the Cisco uBR10012 router.                                                                                                                   |
| 12.3(13a)BC | This command was modified to support PCMM on the Cisco uBR10012 router and the Cisco uBR7246VXR router. The <b>dqos</b> and <b>multimedia</b> keywords were added. |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                 |

## Usage Guidelines

This command is used to reset the gate counter being used to track the total number of committed gates. The CMTS router maintains a count of the total number of gates committed from the router's last startup. This command can be used to either clear all the gate commit counts, or to specifically clear the counts for DQoS- or multimedia-based gates.

A **show** command is used to display the total number of gates committed on the CMTS.

## Examples

The following example shows the committed gate counter being reset to zero:

```
Router# clear packetcable gate counter commit
```

## Related Commands

| Command                                         | Description                                                 |
|-------------------------------------------------|-------------------------------------------------------------|
| <b>packetcable authorize vanilla-docsis-mta</b> | Allows non-DQoS MTAs to send DOCSIS DSX messages.           |
| <b>packetcable gate maxcount</b>                | Sets the maximum number of PCMM gates in the gate database. |

| Command                                | Description                                                               |
|----------------------------------------|---------------------------------------------------------------------------|
| <b>packetcable multimedia</b>          | Enables and displays PacketCable Multimedia processing on the Cisco CMTS. |
| <b>packetcable timer multimedia T1</b> | Sets the default timeout value for T1 timer used in PCMM gate processing. |

# clear pxf

To clear Parallel eXpress Forwarding (PXF) counters and statistics, use the **clear pxf** command in privileged EXEC mode.

```
clear pxf [dma counters | interface interface | statistics {context | diversion | drop | ip | ipv6} | xcm counters]
```

## Syntax Description

|                                   |                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dma counters</b>               | (Optional) Clears the direct memory access (DMA) PXF counters.                                                                                                                                                                                                                                                                                                             |
| <b>interface</b> <i>interface</i> | (Optional) Clears the PXF counters on the specified interface.                                                                                                                                                                                                                                                                                                             |
| <b>statistics</b>                 | (Optional) Type of PXF statistics to clear. The options are: <ul style="list-style-type: none"> <li>• <b>context</b>—Current and historical loads on the PXF.</li> <li>• <b>diversion</b>—Traffic diverted from the PXF.</li> <li>• <b>drop</b>—Dropped packets and bytes.</li> <li>• <b>ip</b>—IP and ICMP statistics.</li> <li>• <b>ipv6</b>—IPv6 statistics.</li> </ul> |
| <b>xcm counters</b>               | Clears the PXF Error Code Correction (ECC) counters.                                                                                                                                                                                                                                                                                                                       |

## Command Default

No default behavior or values

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                        |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(22)S   | This command was introduced on the Cisco 10000 series router.                                                                       |
| 12.2(1)XF1  | This command was introduced on the Cisco uBR10012 router.                                                                           |
| 12.2(4)XF1  | The <b>xcm counters</b> option was introduced to support the Performance Routing Engine (PRE1) module on the Cisco uBR10012 router. |
| 12.3(7)XI1  | This command was integrated into Cisco IOS Release 12.3(7)XI1.                                                                      |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC. The <b>context</b> and <b>ipv6</b> keyword options are not supported.    |
| 12.2(31)SB  | This command was integrated into Cisco IOS Release 12.2(31)SB.                                                                      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. The <b>ipv6</b> keyword option is not supported.                    |

## Usage Guidelines

If no interface is specified, the command clears PXF counters on all interfaces. The **clear pxf** command clears counters associated with the **show pxf dma**, **show pxf interface**, **show pxf statistics**, and **show pxf xcm** commands.



**Cisco uBR10012 Universal Broadband Router**

Not all keyword options are supported in the Cisco IOS software for the Cisco uBR10012 universal broadband router. See the command history table for the unsupported keyword options by release.

The **clear pxf xcm counters** command is supported only on the PRE1 and later processors for the Cisco uBR10012 router. This command is not supported on the PRE processor.

**Examples**

The following example clears PXF statistics for serial interface 1/0/0:

```
Router# clear pxf interface serial 1/0/0
```

The following example clears PXF statistics on all interfaces:

```
Router# clear pxf interface
```

**Related Commands**

| Command                 | Description                                                                                 |
|-------------------------|---------------------------------------------------------------------------------------------|
| show pxf cpu statistics | Displays PXF CPU statistics.                                                                |
| <b>show pxf dma</b>     | Displays the current state of DMA buffers, error counters, and registers on the PXF engine. |
| show pxf interface      | Displays a summary of the statistics accumulated by column 0 of the PXF for an interface.   |
| show pxf statistics     | Displays chassis-wide, summary PXF statistics.                                              |
| <b>show pxf xcm</b>     | Displays PXF XCM information.                                                               |

# clear pxf statistics drl cable-wan-ip

To clear the PXF DRL cable/wan-ip statistics table, use the **clear pxf statistics drl cable-wan-ip** command in privileged EXEC mode.

**clear pxf statistics drl cable-wan-ip**

|                           |                                                                                                                                            |                                                                                                     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords.                                                                                                 |                                                                                                     |
| <b>Command Default</b>    | No default behavior or values.                                                                                                             |                                                                                                     |
| <b>Command Modes</b>      | Privileged EXEC (#)                                                                                                                        |                                                                                                     |
| <b>Command History</b>    | <b>Release</b>                                                                                                                             | <b>Modification</b>                                                                                 |
|                           | 12.2(33)SCB                                                                                                                                | This command was introduced.                                                                        |
| <b>Usage Guidelines</b>   | This command sets the drop count to zero for all entries in the PXF DRL cable/wan-ip statistics table. It does not change any other value. |                                                                                                     |
| <b>Examples</b>           | The following example shows how to clear cable-wan-ip statistics:                                                                          |                                                                                                     |
|                           | Router# <b>clear pxf statistics drl cable-wan-ip</b>                                                                                       |                                                                                                     |
| <b>Related Commands</b>   | <b>Command</b>                                                                                                                             | <b>Description</b>                                                                                  |
|                           | <b>clear pxf statistics drl wan-non-ip</b>                                                                                                 | This command set the drop count to zero for all entries in the PXF DRL wan-non-ip statistics table. |

# clear pxf statistics drl wan-non-ip

To clear the PXF DRL wan-non-ip statistics, use the **clear pxf statistics drl wan-non-ip** command in privileged EXEC mode.

**clear pxf statistics drl wan-non-ip**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCB    | This command was introduced. |

|                         |                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command sets the drop count to zero for all entries in the PXF DRL wan-non-ip statistics table. |
|-------------------------|------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to clear the PXF statistics in wan-non-ip:<br>Router# <b>clear pxf statistics drl wan-non-ip</b> |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|

| <b>Related Commands</b> | <b>Command</b>                               | <b>Description</b>                                                                                |
|-------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------|
|                         | <b>clear pxf statistics drl cable-wan-ip</b> | This command sets the drop count to zero for all entries in the cable or wan-ip statistics table. |

# clear redundancy

To clear the counters and history information that are used by the Redundancy Facility (RF) subsystem, use the **clear redundancy** command in privileged EXEC mode.

**clear redundancy {counters | history}**

## Syntax Description

|                 |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| <b>counters</b> | Clears the RF counters that are maintained by the RF subsystem.           |
| <b>history</b>  | Clears the history of RF activity that is maintained by the RF subsystem. |

## Defaults

No default behavior or values

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(4)XF1  | This command was introduced for the Cisco uBR10012 router.      |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

## Usage Guidelines

The **clear redundancy** command clears the following information, which is shown by the **show redundancy** command:

- **counters**—Number of messages sent and received, buffers used, and synchronization errors.
- **history**—RF subsystem activity, such as checkpoint messages sent between RF clients.

## Examples

The following example shows how to clear the RF counters that are displayed by the **show redundancy** command:

```
Router# clear redundancy counters
```

The following example shows how to clear the RF history information that is displayed by the **show redundancy** command:

```
Router# clear redundancy history
```

## Related Commands

| Command                | Description                            |
|------------------------|----------------------------------------|
| <b>show redundancy</b> | Displays the current redundancy state. |

# controller integrated-cable

To enter controller configuration mode to configure the controller interface for an integrated DOCSIS 3.0 cable interface line card, use the **controller integrated-cable** command in global configuration mode.

## Cisco uBR10012 Router

**controller integrated-cable** *slot/subslot/port*

## Cisco uBR7225VXR and Cisco uBR7246VXR Routers

**controller integrated-cable** *slot/port*

|                    |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>integrated-cable</b><br><i>slot/subslot/port</i> | Identifies the cable interface on the Cisco uBR10012 router. <ul style="list-style-type: none"><li>• <i>slot</i>—Slot where the line card resides. The valid range is from 5 to 8.</li><li>• <i>subslot</i>—Subslot where the line card resides. Available slots are 0 or 1.</li><li>• <i>port</i>—Downstream controller number on the line card. Valid port values are from 0 to 4.</li></ul>                                                                 |
|                    | <b>integrated-cable</b><br><i>slot/port</i>         | Identifies the cable interface on the Cisco uBR7246VXR or Cisco uBR7225VXR router. <ul style="list-style-type: none"><li>• <i>slot</i>—Slot where the line card resides.<ul style="list-style-type: none"><li>– Cisco uBR7246VXR router: The valid range is from 3 to 6.</li><li>– Cisco uBR7225VXR router: The valid range is from 1 to 2.</li></ul></li><li>• <i>port</i>—Downstream port number on the line card. The valid port value is 0 or 1.</li></ul> |
| Command Default    | None                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Command Modes      | Global configuration (config)                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Command History    | <b>Release</b>                                      | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                    | 12.2(33)SCC                                         | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                    | 12.2(33)SCD                                         | This command was modified to support configuration of the controller interface on Cisco uBR7246VXR and Cisco uBR7225VXR universal broadband routers.                                                                                                                                                                                                                                                                                                           |

---

**Examples**

The following example shows how to enter controller configuration mode to configure the controller interface in slot 5, subslot 1, and port 0 of the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# controller integrated-cable 5/1/0
```

---

**Related Commands**

| Command                                       | Description                                              |
|-----------------------------------------------|----------------------------------------------------------|
| <b>annex modulation</b>                       | Sets the annex and modulation rates for each RF channel. |
| <b>rf-channel cable downstream channel-id</b> | Assigns a downstream channel ID to an RF channel.        |
| <b>rf-channel frequency</b>                   | Sets the frequency for each RF channel.                  |
| <b>rf-channel rf-power</b>                    | Sets the RF power output level.                          |
| <b>rf-channel rf-shutdown</b>                 | Enables or disables an RF channel.                       |

# controller modular-cable

To enter controller configuration mode to configure the wideband modular interface controller, use the **controller modular-cable** command in global configuration mode.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**controller modular-cable** *slot/subslot/bay*

## Cisco IOS Release 12.2(33)SCB and later releases

**controller modular-cable** *slot/bay/port* | *slot/subslot/controller*

| Syntax Description                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot/subslot/bay or slot/bay/port</i> | <p>The Wideband SPA slot, subslot, bay, and port.</p> <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the Wideband SIP resides. The valid values are 1 and 3.</li> <li><i>subslot</i>—Subslot where the Wideband SIP resides. The valid value is 0.</li> <li><i>bay</i>—Wideband SIP bay where the SPA resides. The valid range is from 0 to 3.</li> <li><i>port</i>—Port number on the SPA. The valid value is always 0.</li> </ul> |
| <i>slot/subslot/controller</i>           | <p>Modular cable line card slot, subslot, and controller.</p> <ul style="list-style-type: none"> <li><i>slot</i>—Modular cable line card slot. The valid values are 5, 6, 7, and 8.</li> <li><i>subslot</i>—Modular cable line card subslot. The valid values are 0 and 1.</li> <li><i>controller</i>—Modular cable line card controller. The valid range is from 0 to 2.</li> </ul>                                                               |

**Command Default** The command mode is unchanged.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                                                                                                                                                           |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                             |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                                        |
|                 | 12.2(33)SCB | This command was modified. The addressing format for the modular cable interface was changed from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> .                                                    |
|                 | 12.2(33)SCE | This command was modified. This command now supports the Cisco uBR-MC3GX60V cable interface line card. The addressing format <i>slot/subslot/controller</i> for the modular-cable line card was added. |

**Usage Guidelines**

This command indicates where the wideband modular interface controller is located and enters controller configuration mode. The modular interface controller could be either a SPA, or a Cisco uBR-MC3GX60V cable interface line card.

**Examples**

The following example shows how to enter the controller configuration mode for the Cisco Wideband SPA in slot 1, subslot 0, and bay 0.

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/0
```

The following example shows how to enter the controller configuration mode for the Cisco uBR-MC3GX60V line card in slot 8, subslot 1, and controller-unit-number 1.

```
Router# configure terminal
Router(config)# controller modular-cable 8/1/1
```

**Related Commands**

| Command                                           | Description                                                               |
|---------------------------------------------------|---------------------------------------------------------------------------|
| <b>annex modulation</b>                           | Sets the annex and modulation for the Cisco Wideband SPA.                 |
| <b>cable rf-channel</b>                           | Associates an RF channel on a Cisco Wideband SPA with a wideband channel. |
| <b>ip-address (controller)</b>                    | Sets the IP address of the Cisco Wideband SPA FPGA.                       |
| <b>modular-host subslot</b>                       | Specifies the modular-host line card for the Cisco Wideband SPA.          |
| <b>rf-channel cable downstream channel-id</b>     | Assigns a downstream channel ID to an RF channel.                         |
| <b>rf-channel description</b>                     | Specifies the description for each RF channel.                            |
| <b>rf-channel ip-address mac-address udp-port</b> | Sets the IP address, MAC address, and UDP port for each RF channel.       |
| <b>rf-channel network delay</b>                   | Specifies the CIN delay for each RF channel.                              |



# cops ip dscp

To specify the Common Open Policy Service (COPS) Differentiated Services Code Point (DSCP) markings for COPS messages that are transmitted by the Cisco router, use the **cops ip dscp** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**cops ip dscp** [0-63 | default | af11-af43 | cs1-cs7]

**no cops ip dscp** [0-63 | default | af11-af43 | cs1-cs7]

The values for this command specify the markings with which COPS messages are transmitted. The following values are supported for the Cisco CMTS router.

| Syntax Description | 0-63    | DSCP value ranging from 0-63.        |
|--------------------|---------|--------------------------------------|
|                    | af11    | Use AF11 dscp (001010)               |
|                    | af12    | Use AF12 dscp (001100)               |
|                    | af13    | Use AF13 dscp (001110)               |
|                    | af21    | Use AF21 dscp (010010)               |
|                    | af22    | Use AF22 dscp (010100)               |
|                    | af23    | Use AF23 dscp (010110)               |
|                    | af31    | Use AF31 dscp (011010)               |
|                    | af32    | Use AF32 dscp (011100)               |
|                    | af33    | Use AF33 dscp (011110)               |
|                    | af41    | Use AF41 dscp (100010)               |
|                    | af42    | Use AF42 dscp (100100)               |
|                    | af43    | Use AF43 dscp (100110)               |
|                    | cs1     | Use CS1 dscp (001000) [precedence 1] |
|                    | cs2     | Use CS2 dscp (010000) [precedence 2] |
|                    | cs3     | Use CS3 dscp (011000) [precedence 3] |
|                    | cs4     | Use CS4 dscp (100000) [precedence 4] |
|                    | cs5     | Use CS5 dscp (101000) [precedence 5] |
|                    | cs6     | Use CS6 dscp (110000) [precedence 6] |
|                    | cs7     | Use CS7 dscp (111000) [precedence 7] |
|                    | default | Use default dscp (000000)            |
|                    | ef      | Use EF dscp (101110)                 |

## Defaults

- This command is disabled by default.
- For messages transmitted by the Cisco router, the default DSCP value is 0.
- For incoming connections to the Cisco router, by default, the COPS engine takes the DSCP value used by the COPS server that initiates the TCP connection.

## Command Modes

Global configuration (config)

**Command History**

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced to the Cisco CMTS.                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

This feature allows you to change the Differentiated Services Code Point (DSCP) marking for COPS messages that are transmitted or received by the Cisco router. Cisco IOS Release 12.3(13a)BC supports this function with the **cops ip dscp** command. The **cops ip dscp** command changes the default IP parameters for connections between the Cisco router and COPS servers in the cable network.

DSCP values are used in Quality of Service (QoS) configurations on a Cisco router to summarize the relationship between DSCP and IP precedence. This command allows COPS to remark the packets for either incoming or outbound connections.

The default setting is 0 for outbound connections. On default incoming connections, the COPS engine takes the DSCP value from the COPS server initiating the TCP connection.

**Note**

This feature affects all TCP connections with all COPS servers.

- The **cops ip dscp** command allows the Cisco router to re-mark the COPS packets for either incoming or outbound connections.
- This command affects all TCP connections with all COPS servers.
- This command does not affect existing connections to COPS servers. Once you issue this command, this function is supported only for new connections after that point in time.
- For messages transmitted by the Cisco router, the default DSCP value is 0.
- For incoming connections to the Cisco router, the COPS engine takes the DSCP value used by the COPS server that initiates the TCP connection, by default.

For additional information about this feature and related commands, refer to the “COPS Engine Operation on the Cisco CMTS Routers” feature document on Cisco.com.

**Examples**

The following basic example illustrates the use of this command:

The following example illustrates the **cops ip dscp** command with supported command variations:

```
Router(config)# cops ip dscp ?
<0-63> DSCP value
af11 Use AF11 dscp (001010)
af12 Use AF12 dscp (001100)
af13 Use AF13 dscp (001110)
af21 Use AF21 dscp (010010)
af22 Use AF22 dscp (010100)
af23 Use AF23 dscp (010110)
af31 Use AF31 dscp (011010)
af32 Use AF32 dscp (011100)
af33 Use AF33 dscp (011110)
af41 Use AF41 dscp (100010)
af42 Use AF42 dscp (100100)
af43 Use AF43 dscp (100110)
cs1 Use CS1 dscp (001000) [precedence 1]
cs2 Use CS2 dscp (010000) [precedence 2]
cs3 Use CS3 dscp (011000) [precedence 3]
```

```

cs4 Use CS4 dscp (100000) [precedence 4]
cs5 Use CS5 dscp (101000) [precedence 5]
cs6 Use CS6 dscp (110000) [precedence 6]
cs7 Use CS7 dscp (111000) [precedence 7]
default Use default dscp (000000)
ef Use EF dscp (101110)

```

```
Router(config)# cops ip dscp 0-63
```

The following example specifies the COPS server and enables COPS for RSVP on the server. Both of these functions are accomplished by using the **ip rsvp policy cops** command. By implication, the default settings for all remaining COPS for RSVP commands are accepted.

```

Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# ip rsvp policy cops servers 161.44.130.168 161.44.129.6
Router(config)# exit

```

The following examples display three views of the COPS for RSVP configuration on the router, which can be used to verify the COPS for RSVP configuration.

The following example displays the policy server address, state, keepalives, and policy client information:

```

Router# show cops servers

COPS SERVER: Address: 161.44.135.172. Port: 3288. State: 0. Keepalive: 120 sec
 Number of clients: 1. Number of sessions: 1.
COPS CLIENT: Client type: 1. State: 0.

```

The following example displays the policy server address, the ACL ID, and the client/server connection status:

```

Router# show ip rsvp policy cops

COPS/RSVP entry. ACLs: 40 60
 PDPS: 161.44.135.172
 Current state: Connected
 Currently connected to PDP 161.44.135.172, port 0

```

The following example displays the ACL ID numbers and the status for each ACL ID:

```

Router# show ip rsvp policy

Local policy: Currently unsupported
COPS:
ACLs: 40 60 . State: CONNECTED.
ACLs: 40 160 . State: CONNECTING.

```

## Related Commands

| Command                               | Description                                                                                                         |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>cops listeners access-list</b>     | Configures access control lists (ACLs) for inbound connections to all COPS listener applications on the Cisco CMTS. |
| <b>cops tcp window-size</b>           | Overrides the default TCP receive window size that is used by COPS processes.                                       |
| <b>debug packetcable cops</b>         | Enables debugging processes for PacketCable with the COPS engine.                                                   |
| <b>debug packetcable gate control</b> | Enables and displays debugging processes for PacketCable gate control.                                              |

| Command                             | Description                                                                                       |
|-------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>debug packetcable subscriber</b> | Enables and displays debugging processes for PacketCable subscribers.                             |
| <b>show cops servers</b>            | Displays COPS server addresses, port, state, keepalives, and policy client information.           |
| <b>show debug</b>                   | Displays current debugging information that includes PacketCable COPS messages on the Cisco CMTS. |
| <b>show ip rsvp policy</b>          | Displays policy server addresses, ACL IDs, and client/server connection status.                   |

# cops listeners access-list

To configure access control lists (ACLs) for inbound connections to all Common Open Policy Service (COPS) listener applications on the Cisco CMTS router, use the **cops listeners access-list** command in global configuration mode. To remove this setting from the Cisco CMTS router, use the **no** form of this command.

**cops listeners access-list** {*acl-num* | *acl-name*}

**no cops listeners access-list** {*acl-num* | *acl-name*}

## Syntax Description

|                 |                                                                                                                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>acl-num</i>  | Alphanumeric identifier of up to 30 characters, beginning with a letter that identifies the ACL to apply to the current interface.                                                                     |
| <i>acl-name</i> | Numeric identifier that identifies the access list to apply to the current interface. For standard access lists, the valid range is 1 to 99; for extended access lists, the valid range is 100 to 199. |

## Command Default

Access lists are not configured by default on the Cisco router.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced.                                                                                       |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

When using ACLs with cable monitor and the Cisco uBR10012 router, combine multiple ACLs into one ACL, and then configure cable monitor with the consolidated ACL. For more information about cable monitor, refer to the “Cable Monitor and Intercept Features for the Cisco CMTS” documentation on Cisco.com.

## Examples

The following example illustrates a short access list configuration for the COPS listener feature:

```
Router# cops listeners access-list 40
```

## Related Commands

| Command                       | Description                                                                                 |
|-------------------------------|---------------------------------------------------------------------------------------------|
| <b>cops ip dscp</b>           | Specifies the COPS DSCP markings for COPS messages that are transmitted by the Cisco router |
| <b>cops tcp window-size</b>   | Overrides the default TCP receive window size that is used by COPS processes.               |
| <b>debug packetcable cops</b> | Enables debugging processes for PacketCable with the COPS engine.                           |

| Command                               | Description                                                                                       |
|---------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>debug packetcable gate control</b> | Enables and displays debugging processes for PacketCable gate control.                            |
| <b>debug packetcable subscriber</b>   | Enables and displays debugging processes for PacketCable subscribers.                             |
| <b>show cops servers</b>              | Displays COPS server addresses, port, state, keepalives, and policy client information.           |
| <b>show debug</b>                     | Displays current debugging information that includes PacketCable COPS messages on the Cisco CMTS. |
| <b>show ip rsvp policy</b>            | Displays policy server addresses, ACL IDs, and client/server connection status.                   |

# cops tcp window-size

To override the default TCP receive window size on the Cisco CMTS router, use the **cops tcp window-size** command in global configuration mode. This setting allows you to prevent the COPS server from sending too much data at one time. To return the TCP window size to a default setting of 4K, use the **no** form of this command.

**cops tcp window-size** *bytes*

**no cops tcp window-size**

## Syntax Description

|              |                                                                                             |
|--------------|---------------------------------------------------------------------------------------------|
| <i>bytes</i> | This is the TCP window size setting in bytes. This value can range from 516 to 65535 bytes. |
|--------------|---------------------------------------------------------------------------------------------|

## Defaults

The default COPS TCP window size is 4000 bytes.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced.                                                                                       |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

This command does not affect existing connections to COPS servers. Once you issue this command, this function is supported only for new connections after that point in time.

## Examples

The following example configures the TCP window size to be 64000 bytes.

```
Router(config)# cops tcp window-size 64000
```

## Related Commands

| Command                               | Description                                                                                                                                                   |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cops ip dscp</b>                   | Specifies the Common Open Policy Service (COPS) Differentiated Services Code Point (DSCP) markings for COPS messages that are transmitted by the Cisco router |
| <b>cops listeners access-list</b>     | Configures access control lists (ACLs) for inbound connections to all COPS listener applications on the Cisco CMTS.                                           |
| <b>debug packetcable cops</b>         | Enables debugging processes for PacketCable with the COPS engine.                                                                                             |
| <b>debug packetcable gate control</b> | Enables and displays debugging processes for PacketCable gate control.                                                                                        |

| Command                             | Description                                                                                       |
|-------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>debug packetcable subscriber</b> | Enables and displays debugging processes for PacketCable subscribers.                             |
| <b>show cops servers</b>            | Displays COPS server addresses, port, state, keepalives, and policy client information.           |
| <b>show debug</b>                   | Displays current debugging information that includes PacketCable COPS messages on the Cisco CMTS. |
| <b>show ip rsvp policy</b>          | Displays policy server addresses, ACL IDs, and client/server connection status.                   |



# cpd

To enable the Control Point Discovery (CPD) feature, use the **cpd** command in global configuration mode. To disable CPD, use the **no** form of this command.

**cpd**

**no cpd**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no keywords or arguments. |
|---------------------------|--------------------------------------------|

|                        |                 |
|------------------------|-----------------|
| <b>Command Default</b> | CPD is enabled. |
|------------------------|-----------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| <b>Command History</b> | Release      | Modification                                                                                                     |
|------------------------|--------------|------------------------------------------------------------------------------------------------------------------|
|                        | 12.3(21a)BC3 | This command was introduced.                                                                                     |
|                        | 12.2(33)SCA  | This command was integrtd into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

|                 |                                                          |
|-----------------|----------------------------------------------------------|
| <b>Examples</b> | The following example shows the cpd enabled on a router: |
|-----------------|----------------------------------------------------------|

```
Router(config)# cpd
```

| <b>Related Commands</b> | Command          | Description                                   |
|-------------------------|------------------|-----------------------------------------------|
|                         | <b>cpd cr-id</b> | Configures a control relationship identifier. |

# cpd cr-id

To configure a Control relationship identifier (CR ID), the the **cpd cr-id** command in global configuration mode. To disable the CR ID, use the **no** form of this command.

```
cpd cr-id cr id number

no cpd cr-id
```

|                    |              |                                                                 |
|--------------------|--------------|-----------------------------------------------------------------|
| Syntax Description | cr id number | Control relationship identifier. The valid range is 1 to 65535. |
|--------------------|--------------|-----------------------------------------------------------------|

|                 |                               |
|-----------------|-------------------------------|
| Command Default | The cr-id is configured as 1. |
|-----------------|-------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

| Command History | Release      | Modification                                                                                                       |
|-----------------|--------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(21a)BC3 | This command was introduced.                                                                                       |
|                 | 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

|          |                                                                                                                         |
|----------|-------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows the control relationship identifier configured as 236:<br><br>Router(config)# cpd cr-id 236 |
|----------|-------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command | Description                |
|------------------|---------|----------------------------|
|                  | cpd     | Enables CPD functionality. |

# cpe max

To create a DOCSIS configuration file that specifies the maximum number of CPE devices that can use the CM to connect to the cable network, use the **cpe max** command in cable config-file configuration mode. To remove the CPE specification, use the **no** form of this command.

**cpe max** *cpe-num*

**no cpe max**

## Syntax Description

|                |                                                        |
|----------------|--------------------------------------------------------|
| <i>cpe-num</i> | Specifies the number of CPEs. Valid range is 1 to 254. |
|----------------|--------------------------------------------------------|

## Command Default

A maximum of one CPE device can use the CM to connect to the cable network.

## Command Modes

Cable config-file configuration (config-file)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.1(2)EC1  | This command was introduced.                                    |
| 12.2(4)BC1  | Support was added to the Release 12.2 BC train.                 |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

## Usage Guidelines

The CM enforces the limitation imposed by the **cpe max** command, but the CMTS might enforce its own lower number of CPE devices. On Cisco CMTS routers, a *cpe-num* value of 0 enables an unlimited number of hosts, but on some CMs, this value provides only 0 hosts.

## Examples

The following example shows how to set the maximum CPE value for the configuration file:

```
Router(config)# cable config-file channeloverride.cm
Router(config-file)# cpe max 3
Router(config-file)# exit
```

## Related Commands

| Command                  | Description                                                             |
|--------------------------|-------------------------------------------------------------------------|
| <b>cable config-file</b> | Creates a DOCSIS configuration file and enters configuration file mode. |
| <b>access-denied</b>     | Disables access to the network.                                         |
| <b>channel-id</b>        | Specifies upstream channel ID.                                          |
| <b>download</b>          | Specifies download information for the configuration file.              |
| <b>frequency</b>         | Specifies downstream frequency.                                         |
| <b>option</b>            | Provides config-file options.                                           |

| Command              | Description                                                     |
|----------------------|-----------------------------------------------------------------|
| <b>privacy</b>       | Specifies privacy options for baseline privacy images.          |
| <b>service-class</b> | Specifies service class definitions for the configuration file. |
| <b>snmp manager</b>  | Specifies Simple Network Management Protocol (SNMP) options.    |
| <b>timestamp</b>     | Enables time-stamp generation.                                  |



# Cable Commands: d through h

Revised: August 12, 2013, OL-15510-17

## New Commands

| Command                                            | Cisco IOS Software Release |
|----------------------------------------------------|----------------------------|
| downstream local upstream                          | 12.3(23)BC                 |
| downstream modular-cable rf-channel (interface)    | 12.3(23)BC                 |
| downstream integrated-cable rf-channel (interface) | 12.2(33)SCB                |
| depi-class                                         | 12.2(33)SCC                |
| depi-tunnel                                        | 12.2(33)SCC                |
| dest-ip                                            | 12.2(33)SCC                |
| docsis-policy                                      | 12.2(33)SCC                |
| docsis-version                                     | 12.2(33)SCC                |
| downstream                                         | 12.2(33)SCC                |
| depi eqam-stats                                    | 12.2(33)SCE                |
| depi cin-failover                                  | 12.2(33)SCF                |
| description (bonding-group)                        | 12.2(33)SCG                |

## Modified Commands

| Command                                         | Cisco IOS Software Release |
|-------------------------------------------------|----------------------------|
| downstream local upstream                       | 12.2(33)SCB                |
| downstream modular-cable rf-channel             | 12.2(33)SCB                |
| downstream modular-cable rf-channel (interface) | 12.2(33)SCB                |
| flowcontrol                                     | 12.2(33)SCB                |
| hold-queue                                      | 12.2(33)SCB                |
| hw-module bay reload                            | 12.2(33)SCB                |
| duration                                        | 12.2(33)SCD2               |
| downstream modular-cable rf-channel (interface) | 12.2(33)SCE                |

**Replaced Commands**

The following commands have been replaced by new commands beginning in the following Cisco IOS software releases:

| Command              | Replacement Command  | Beginning Cisco IOS Release |
|----------------------|----------------------|-----------------------------|
| enforced qos-profile | qos-profile enforced | 12.3(9a)BC                  |

# depi cin-failover

To enable a failover when Converged Interconnect Network (CIN) failure occurs on Downstream External PHY Interface (DEPI), use the **depi cin-failover** command in global configuration mode. To disable the failover when the CIN fails on the DEPI, use the **no** form of this command.

**depi cin-failover** [**cpu-threshold** {**high** *threshold\_value* **low** *threshold\_value*}]

**no depi cin-failover**

## Syntax Description

|                        |                                                                               |
|------------------------|-------------------------------------------------------------------------------|
| <b>cpu-threshold</b>   | Configures the CPU threshold on the line card.                                |
| <b>high</b>            | Sets the high threshold level. Default value is 95.                           |
| <b>low</b>             | Sets the low threshold level. Default value is 85.                            |
| <i>threshold_value</i> | Threshold value of CPU usage in percentage. The valid range is from 0 to 100. |

## Command Default

The DEPI CIN failover configuration is disabled by default.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                                                                          |
|--------------|---------------------------------------------------------------------------------------|
| 12.2(33)SCF  | This command was introduced.                                                          |
| 12.2(33)SCF4 | This command was modified. The <b>cpu-threshold</b> keyword was added to the command. |

## Usage Guidelines

If DEPI Control Plane High Availability is configured, the **depi cin-failover command**, which is configured globally, triggers a cable line card switchover when a CIN failure occurs.

The **depi cin-failover cpu-threshold** command allows you to set a CPU threshold to alter when a failover due to CIN failure is allowed to happen.

- When the **high** threshold is reached, a failover due to CIN failure is disabled.
- If (and only if) the **high** threshold was reached, the CPU will have to drop lower than the configured **low** threshold before a failover due to CIN failure is enabled again.



### Note

In Cisco IOS Release 12.2(33)SCE, DEPI CIN triggered failover is automatically enabled with control plane DEPI. The **depi cin-failover** command is introduced in Cisco IOS Release 12.2(33)SCF and is disabled by default.

Examples

The following example shows how to configure a CIN failover:

```
Router(config)# depi
Router(config)# depi cin-failover
Router(config)# exit
```

The following example shows how to set the CPU threshold value:

```
Router(config)# depi
Router(config)# depi cin-failover cpu-threshold high 95 low 85
Router(config)# exit
```

Related Commands

| Command           | Description                               |
|-------------------|-------------------------------------------|
| show depi tunnel  | Displays all active control connections.  |
| show depi session | Displays information about DEPI sessions. |



# depi-class

To create a template of Downstream External PHY Interface (DEPI) control plane configuration settings, which different pseudowire classes can inherit, and to enter the DEPI class configuration mode, use the **depi-class** command in global configuration mode. To remove a specific DEPI class configuration, use the **no** form of this command.

**depi-class** *depi-class-name*

**no depi-class** *depi-class-name*

|                           |                        |                                                                                                                                      |
|---------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>depi-class-name</i> | Name of the DEPI class. The <i>depi-class-name</i> argument must be specified to configure multiple sets of DEPI control parameters. |
|---------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------|

|                        |                              |
|------------------------|------------------------------|
| <b>Command Default</b> | No DEPI classes are defined. |
|------------------------|------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| <b>Command History</b> | Release     | Modification                 |
|------------------------|-------------|------------------------------|
|                        | 12.2(33)SCC | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>The <b>depi-class</b> <i>depi-class-name</i> command allows you to configure a DEPI class template that consists of configuration settings used by different pseudowire classes. The <b>depi-class</b> command enters DEPI class configuration mode, where DEPI control plane parameters are configured.</p> <p>You must use the same DEPI class in the pseudowire configuration at both ends of a Layer 2 control channel.</p> |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | <p>The following example shows how to enter DEPI class configuration mode to create a DEPI class configuration template for the class named SPA0:</p> |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# depi-class SPA0
Router(config-depi-ctrl SPA0)#
```

| <b>Related Commands</b> | Command            | Description                                                                                                                                                                                        |
|-------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | <b>l2tp-class</b>  | Creates a template of Layer 2 Tunnel Protocol (L2TP) control plane configuration settings that can be inherited by different pseudowire classes and enters the L2TP class configuration mode.      |
|                         | <b>depi-tunnel</b> | Creates a template of Downstream External PHY Interface (DEPI) tunnel configuration settings, which different pseudowire classes can inherit, and enters the DEPI data session configuration mode. |

| Command                  | Description                              |
|--------------------------|------------------------------------------|
| <b>show depi tunnel</b>  | Displays all active control connections. |
| <b>show depi session</b> | Displays established DEPI data sessions. |

# depi eqam-stats

To enable debugging information for Downstream External PHY Interface (DEPI) EQAM statistics on the Cisco CMTS router, use the **depi eqam-stats** command in global configuration mode. To disable debugging information, use the **no** form of this command.

**depi eqam-stats**

**no depi eqam-stats**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The DEPI EQAM statistics configuration is enabled by default.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCE | This command was introduced. |

## Usage Guidelines

Cisco RF Gateway 10 sends EQAM statistics to the Cisco CMTS router. No other EQAM supports the EQAM statistics feature.

## Examples

The following example shows how to configure DEPI EQAM statistics on the Cisco CMTS router:

```
Router# configure terminal
Router(config)# depi eqam-stats
```

## Related Commands

| Command                  | Description                               |
|--------------------------|-------------------------------------------|
| <b>show depi session</b> | Displays information about DEPI sessions. |

# depi-tunnel

To create a template of Downstream External PHY Interface (DEPI) tunnel configuration settings, which different pseudowire classes can inherit, and to enter the DEPI data session configuration mode, use the **depi-tunnel** command in the global configuration mode or subinterface configuration mode. To remove a configured DEPI tunnel, use the **no** form of this command.

```
depi-tunnel depi-tunnel-name

no depi-tunnel depi-tunnel-name
```

|                    |                  |                          |
|--------------------|------------------|--------------------------|
| Syntax Description | depi-tunnel-name | Name of the DEPI tunnel. |
|--------------------|------------------|--------------------------|

|                 |                                                 |
|-----------------|-------------------------------------------------|
| Command Default | This command has no default behavior or values. |
|-----------------|-------------------------------------------------|

|               |                                                                            |
|---------------|----------------------------------------------------------------------------|
| Command Modes | Global configuration (config)<br>Subinterface configuration (config-subif) |
|---------------|----------------------------------------------------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | <p>The <b>depi-tunnel</b> creates a template of DEPI tunnel configuration settings. The DEPI data session inherits the control plane configuration settings of a depi-control template.</p> <p>The following depi data session configuration options are available in this mode:</p> <ul style="list-style-type: none"> <li>l2tp-class</li> <li>depi-class</li> <li>dest-ip</li> <li>tos</li> </ul> |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to create a template of DEPI tunnel configuration settings in the global configuration mode and enter the DEPI data session configuration mode:</p> <pre>Router# configure terminal Router(config)# depi-tunnel rfc6 Router(config-depi-tunnel)#</pre> <p>The following example shows how to create a template of DEPI tunnel configuration settings in the subinterface configuration mode:</p> <pre>Router(config)# interface qam 6/4.1 Router(config-subif)# depi-tunnel 0</pre> |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                  | Description                                                                                                                                                                                        |
|------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>l2tp-class</b>        | Creates a template of Layer 2 Tunnel Protocol (L2TP) control plane configuration settings, which different pseudowire classes can inherit, and enters the L2TP class configuration mode.           |
|                  | <b>depi-class</b>        | Creates a template of Downstream External PHY Interface (DEPI) control plane configuration settings, which different pseudowire classes can inherit, and enters the DEPI class configuration mode. |
|                  | <b>dest-ip</b>           | Assigns an IP address to the destination network.                                                                                                                                                  |
|                  | <b>tos</b>               | Configures the Type of Service (ToS) byte in the header of Layer 2 tunneled packets.                                                                                                               |
|                  | <b>show depi tunnel</b>  | Displays all active control connections.                                                                                                                                                           |
|                  | <b>show depi session</b> | Displays established DEPI data sessions.                                                                                                                                                           |

# description (bonding-group)

To add a description for a bonding group on the Cisco CMTS router, use the **description** command in cable interface configuration mode. To remove a description for a bonding group, use the **no** form of this command.

**description** *description*

**no description**

|                    |                    |                                                                                                       |
|--------------------|--------------------|-------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>description</i> | Specifies a description for the bonding group. The character-string can be up to 128 characters long. |
|--------------------|--------------------|-------------------------------------------------------------------------------------------------------|

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| Command Default | By default, description for a bonding group does not exist. |
|-----------------|-------------------------------------------------------------|

|               |                                     |
|---------------|-------------------------------------|
| Command Modes | Interface configuration (config-if) |
|---------------|-------------------------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCG | This command was introduced. |

|                  |                                                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>description</b> command adds a comment to the configuration to provide information about the bonding group. |
|------------------|--------------------------------------------------------------------------------------------------------------------|

|          |                                                                               |
|----------|-------------------------------------------------------------------------------|
| Examples | The following example shows how to specify a description for bonding group 1: |
|----------|-------------------------------------------------------------------------------|

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface cable 8/0/0
Router(config-if)# cable upstream bonding-group 1
Router(config-upstream-bonding)# description UBG1
Router(config-upstream-bonding)# end

Router# show running interface cable 8/0/0

Building configuration...

Current configuration : 1443 bytes
!
interface Cable8/0/0
 downstream Modular-Cable 8/0/0 rf-channel 0-3
 cable ip-init apm
 cable mtc-mode
 no cable packet-cache
 cable bundle 6
 cable upstream max-ports 4
 cable upstream bonding-group 1
```

```
description UBG1
upstream 0
upstream 1
upstream 2
upstream 3
attributes 80000000
```

**Associated Features** The **description** command is used to configure the [Upstream Channel Bonding](#) feature.

| Related Commands | Command                         | Description                                                           |
|------------------|---------------------------------|-----------------------------------------------------------------------|
|                  | <b>cable fiber-node</b>         | Enters cable fiber-node configuration mode to configure a fiber node. |
|                  | <b>upstream cable connector</b> | Specifies the upstream channel ports for a fiber node.                |

# description (cable fiber-node)

To specify a description for a fiber node, use the **description** command in cable fiber-node configuration mode. To remove a description for a fiber node, use the **no** form of this command.

**description** *description*

**no description**

## Syntax Description

|                    |                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------|
| <i>description</i> | Specifies a description for the cable fiber node. The character-string can be up to 80 characters long. |
|--------------------|---------------------------------------------------------------------------------------------------------|

## Command Default

If the **description** command is not issued, a description does not exist.

## Command Modes

Cable fiber-node configuration (config-fiber-node)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS release 12.2(33)SCA. |

## Usage Guidelines

The **description** command adds a comment to the configuration to provide information about the fiber node.

## Examples

The following example shows how to specify a description for fiber node 5:

```
Router# configure terminal
Router(config)# cable fiber-node 5
Router(config-fiber-node)# description Branch office 5
```

## Related Commands

| Command                                    | Description                                                                         |
|--------------------------------------------|-------------------------------------------------------------------------------------|
| <b>cable fiber-node</b>                    | Enters cable fiber-node configuration mode to configure a fiber node.               |
| <b>downstream cable</b>                    | Assigns a primary downstream channel for a fiber node.                              |
| <b>downstream modular-cable rf-channel</b> | Specifies the RF channels that are available for wideband channels on a fiber node. |
| <b>upstream cable connector</b>            | Specifies the upstream channel ports for a fiber node.                              |



# dest-ip

To assign an IP address to the edge quadrature amplitude modulation (EQAM), use the **dest-ip** command in DEPI tunnel configuration mode. To remove a specific destination IP address, use the **no** form of this command.

**dest-ip** *dest-ip-address*

**no dest-ip** *dest-ip-address*

## Syntax Description

|                        |                         |
|------------------------|-------------------------|
| <i>dest-ip-address</i> | IP address of the EQAM. |
|------------------------|-------------------------|

## Command Default

This command has no default behavior or values.

## Command Modes

DEPI tunnel configuration

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

The **dest-ip** *dest-ip-address* command allows you to configure the IP address of the EQAM.

## Examples

The following example shows how to assign 1.3.4.155 as the destination IP address:

```
Router# configure terminal
Router(config)# depi-tunnel rf6
Router(config-depi-tunnel)# dest-ip 1.3.4.155
```

## Related Commands

| Command                  | Description                                                                                                                                                                                        |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>l2tp-class</b>        | Creates a template of Layer 2 Tunnel Protocol (L2TP) control plane configuration settings, which different pseudowire classes can inherit, and enters the L2TP class configuration mode.           |
| <b>depi-class</b>        | Creates a template of Downstream External PHY Interface (DEPI) control plane configuration settings, which different pseudowire classes can inherit, and enters the DEPI class configuration mode. |
| <b>depi-tunnel</b>       | Specifies the name of the depi-tunnel and enters the DEPI tunnel configuration mode.                                                                                                               |
| <b>tos</b>               | Configures the Type of Service (ToS) byte in the header of Layer 2 tunneled packets.                                                                                                               |
| <b>show depi tunnel</b>  | Displays all active control connections.                                                                                                                                                           |
| <b>show depi session</b> | Displays established DEPI data sessions.                                                                                                                                                           |

# diagnostic load

To load a Field Diagnostic image to the line card for field diagnostic testing, enter the **diagnostic load** command.

```
diagnostic load {slot slot | subslot slot/subslot} image-url [autostart test {all [port port-number | WORD]} | basic | default | per-port port-number}]
```

| Syntax Description                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>slot</b>                        | Specifies that the line card downloading the Field Diagnostic image is in a full slot as opposed to a subslot.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>subslot</b>                     | Specifies that the line card downloading the Field Diagnostic image is in a subslot (in other words, a half-height line card) as opposed to a full slot.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>slot</i>                        | Specifies the number of the slot where the line card downloading the Field Diagnostic image is located on the router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>subslot</i>                     | Specifies the number of the subslot where the line card downloading the Field Diagnostic image is located on the router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>image-url</i>                   | Specifies the path where the Field Diagnostic image is being downloaded from. <ul style="list-style-type: none"> <li>If the Field Diagnostic image was saved to the router's Flash file system, enter the file system (such as disk0: or disk1:) as the <i>image-url</i>.</li> <li>If the Field Diagnostic image was saved to a server, the <i>image-url</i> will include <i>server-type://path</i>, where <i>server-type</i> is the type of server (typically either FTP or TFTP) and <i>path</i> is the path to the file on the TFTP server where the Field Diagnostic image has been saved.</li> </ul> |
| <b>autostart</b>                   | If <b>autostart</b> is specified, the diagnostic testing process for the line card will begin automatically once the Field Diagnostic image has been loaded onto the line card.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>test</b>                        | The <b>test</b> option is used to specify which type of testing will occur. If the <b>test</b> option is not entered, the default test is used.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>all</b>                         | When used after the <b>test</b> option, specifies that all Field Diagnostic tests will be run during the testing period, including the external loopback test.<br>When used after the <b>port</b> option, specifies that external loopback tests should be run on all ports on the line card.                                                                                                                                                                                                                                                                                                             |
| <b>port</b> <i>port-number</i>     | Specifies the port number on the interface that should perform the external loopback test.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>WORD</i>                        | Specifies a range of ports.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>basic</b>                       | Specifies that the basic Field Diagnostic test suite will be run. The basic test suite will catch most hardware problems but not run each individual test like the <b>all</b> test suite option. The advantage of running the basic test suite is that it takes less time to run than the other test suites.                                                                                                                                                                                                                                                                                              |
| <b>default</b>                     | Specifies that the default test suite will be run. The default test suite will run all Field Diagnostic tests for the particular line card with the exception of the external loopback test.<br><br>If no test suite or test is specified when requesting a test, the default test suite is run.                                                                                                                                                                                                                                                                                                          |
| <b>per-port</b> <i>port-number</i> | Specifies that an external loopback test should be run on a specific port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**Command Default** If the **autostart** option is entered but no test is specified, the default test suite is the suite used to test the line card.

**Command Modes** Privileged EXEC

| Command History | Release    | Modification                                                   |
|-----------------|------------|----------------------------------------------------------------|
|                 | 12.2(16)BX | This command was introduced.                                   |
|                 | 12.3(13)BC | This command was integrated into Cisco IOS Release 12.3(13)BC. |

**Usage Guidelines** Entering this command and successfully downloading the Field Diagnostic image will disrupt normal line card operation. To remove the Field Diagnostic image from a line card and restore normal line card operation, use the **diagnostic unload** command.

If the **autostart** option is not specified, diagnostic tests can be run on the line card after the Field Diagnostic image has been loaded by entering the **diagnostic start** command.

**Examples** In the following example, the **diagnostic load** command is used to download the Field Diagnostic image in TFTP server 127.1.1.1/mytftpfolder to the line card in slot 2. If **yes** is entered at the prompt below, the router will be placed in Field Diagnostic mode.

```
Router# diagnostic load slot 2 tftp://127.1.1.1/mytftpfolder/c10k-fdiagslc-mz.1.1.bin
```

```

WARNING:The specified line card will be taken offline, please ensure that
all traffic has been redirected before executing this command.
```

```
NOTE:The "diagnostic unload <target>" command must be used after diagnostic
testing to resume normal line card operation.
```

```

```

```
Field Diagnostics Image Loading Parameters
```

```
=====
Slot:2 (6oc3pos-1)
Image URL:tftp://127.1.1.1/mytftpfolder/c10k-fdiagslc-mz.1.1.bin
Auto-Start:disabled
=====
```

```
% Are you sure that you want to perform this operation? [no]:
```

| Related Commands | Command                                      | Description                                                                                                                                      |
|------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>diagnostic event-log size</b>             | Sets the size of the event table.                                                                                                                |
|                  | <b>diagnostic ondemand action-on-failure</b> | Sets the number of errors allowed in the Field Diagnostic test before the Field Diagnostic test is stopped.                                      |
|                  | <b>diagnostic ondemand iterations</b>        | Sets the number of times each specific Field Diagnostic test will be run when a Field Diagnostic test is initiated.                              |
|                  | <b>diagnostic start</b>                      | Starts Field Diagnostic testing on the line card.                                                                                                |
|                  | <b>diagnostic stop</b>                       | Stops an in-progress Field Diagnostic test.                                                                                                      |
|                  | <b>diagnostic unload</b>                     | Unloads the Field Diagnostic image from the line card and restores normal line card operation.                                                   |
|                  | <b>show diagnostic content</b>               | Shows the Field Diagnostic test list for a particular line card.                                                                                 |
|                  | <b>show diagnostic events</b>                | Displays the history of Field Diagnostic events since the last system reload.                                                                    |
|                  | <b>show diagnostic ondemand settings</b>     | Shows the diagnostic on-demand settings.                                                                                                         |
|                  | <b>show diagnostic result</b>                | Shows the results of the Field Diagnostic test.                                                                                                  |
|                  | <b>show diagnostic ood-status</b>            | Displays various status information, such as line card slot and name, Field Diagnostic image status, and previous Field Diagnostic test results. |

# diagnostic ondemand action-on-failure

To set an error count limit or to stop testing once a diagnostic error event is detected, use the **diagnostic ondemand action-on-failure** command.

**diagnostic ondemand action-on-failure** [*continue failure-limit* | **stop**]

## Syntax Description

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>continue</b> <i>failure-limit</i> | Specifies that Field Diagnostic testing should continue on the line card after a failed test occurs. The <i>failure-limit</i> specifies the number of failed tests that can be detected before testing on the line card should stop. A <i>failure-limit</i> of 0 means testing should continue regardless of the number of failed tests.<br><br><b>Note</b> The <i>failure-limit</i> is the number of failed tests, not errors within a single test. For example, if four errors occur during a single test, the <i>failure-limit</i> for that individual test would be 1, not 4. |
| <b>stop</b>                          | Specifies that Field Diagnostic testing should stop when an error event occurs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## Command Default

If this command is not entered, a default *failure-limit* of 0 is used. Therefore, testing will continue regardless of the number of errors unless the **diagnostic ondemand action-on-failure** command is used to change the default setting.

## Command Modes

Privileged EXEC (#)

## Command History

| Release    | Modification                                                   |
|------------|----------------------------------------------------------------|
| 12.2(16)BX | This command was introduced.                                   |
| 12.3(13)BC | This command was integrated into Cisco IOS Release 12.2(13)BC. |

## Usage Guidelines

The **diagnostic ondemand action-on-failure** settings cannot be saved to a Cisco IOS configuration file. Therefore, the **diagnostic ondemand action-on-failure** command will need to be re-entered each time a router is reset or power cycled if the action-on-failure settings should be maintained.

The **show diagnostic ondemand settings** command can be used to verify the **diagnostic ondemand action-on-failure** setting.

The **show diagnostic events event-type error** command can be used to gather additional information about an error event.

## Examples

In the following example, the diagnostic on-demand iteration and action-on-failure settings are changed using **diagnostic ondemand iterations** and **diagnostic ondemand action-on-failure**. The changed settings are then confirmed using **show diagnostic ondemand settings**.

```
Router# diagnostic ondemand iterations 2
```

```
Router# diagnostic ondemand action-on-failure stop
Router# show diagnostic ondemand settings
```

```
Test iterations = 2
```

**Related Commands<sup>A</sup>**

| Command                                      | Description                                                                                                                                      |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>diagnostic event-log size</b>             | Sets the size of the event table.                                                                                                                |
| <b>diagnostic load</b>                       | Loads the Field Diagnostic image onto the line card.                                                                                             |
| <b>diagnostic ondemand action-on-failure</b> | Sets the number of errors allowed in the Field Diagnostic test before the Field Diagnostic test is stopped.                                      |
| <b>diagnostic ondemand iterations</b>        | Sets the number of times each specific Field Diagnostic test will be run when a Field Diagnostic test is initiated.                              |
| <b>diagnostic start</b>                      | Starts Field Diagnostic testing on the line card.                                                                                                |
| <b>diagnostic stop</b>                       | Stops an in-progress Field Diagnostic test.                                                                                                      |
| <b>show diagnostic content</b>               | Shows the Field Diagnostic test list for a particular line card.                                                                                 |
| <b>show diagnostic events</b>                | Displays the history of Field Diagnostic events since the last system reload.                                                                    |
| <b>show diagnostic ondemand settings</b>     | Shows the diagnostic on-demand settings.                                                                                                         |
| <b>show diagnostic result</b>                | Shows the results of the Field Diagnostic test.                                                                                                  |
| <b>show diagnostic ood-status</b>            | Displays various status information, such as line card slot and name, Field Diagnostic image status, and previous Field Diagnostic test results. |

# diagnostic ondemand iterations

To set the number of times a diagnostic test or set of tests will be run when the **diagnostic start** command is entered, enter the **diagnostic ondemand iterations** command.

**diagnostic ondemand iterations** *iteration-count*

## Syntax Description

*iteration-count*

The number of tests to be run each time a Field Diagnostic test is started. For instance, if the *iteration-count* is set at 2 and the Field Diagnostic test specifies that tests 1, 5, and 10 will be run, tests 1, 5, and 10 will all be run twice. If basic or default testing is specified and the *iteration-count* is 2, all basic or default tests will be run twice.

## Command Default

The default *iteration-count* is 1.

## Command Modes

Privileged EXEC (#)

## Command History

| Release    | Modification                                                   |
|------------|----------------------------------------------------------------|
| 12.2(16)BX | This command was introduced.                                   |
| 12.3(13)BC | This command was integrated into Cisco IOS Release 12.3(13)BC. |

## Usage Guidelines

The **diagnostic ondemand iterations** settings cannot be saved to a Cisco IOS configuration file. Therefore, the **diagnostic ondemand iterations** command will need to be re-entered each time a router is reset or power cycled if a nondefault setting needs to be maintained.

The **show diagnostic ondemand settings** command can be used to verify the **diagnostic ondemand iterations** setting.

## Examples

In the following example, the diagnostic on-demand iteration and action-on-failure settings are changed using **diagnostic ondemand iterations** and **diagnostic ondemand action-on-failure**. The changed settings are then confirmed using **show diagnostic ondemand settings**.

```
Router# diagnostic ondemand iterations 2
Router# diagnostic ondemand action-on-failure stop
Router# show diagnostic ondemand settings
```

```
Test iterations = 2
Action on test failure = stop
```

In the following example, the **diagnostic ondemand iterations** command is first used to change the number of iterations per test to 2. Therefore, a Field Diagnostic test is run twice (note that the output of the **diagnostic start** command reflects the test being run twice).

After the initial test, the *iteration-count* is then changed to 3 and the same test is run. Note that the output of **diagnostic start** shows each test being run three times as opposed to two after the *iteration-count* was changed using the **diagnostic ondemand iterations 3** command.

```
Router# diagnostic ondemand iterations 2
Router# diagnostic start slot 8 test 1
Slot 8: Running test(s) 1 may generate packets out of the card interface.

Do you want to run the selected test(s)? [no]: y
Router#

FDIAG [slot 8]> Running Field Diagnostics [Iteration #1] ...
FDIAG [slot 8]> Running MPC860 Register Test {ID=1} ...
FDIAG [slot 8]> MPC860 Register Test {ID=1} passed

FDIAG [slot 8]> Running Field Diagnostics [Iteration #2] ...
FDIAG [slot 8]> Running MPC860 Register Test {ID=1} ...
FDIAG [slot 8]> MPC860 Register Test {ID=1} passed

FDIAG [slot 8]> Total testing time = 00:00:00.500

FDIAG [slot 8]> Field Diagnostics passed with the selected test(s)

*Jun 13 16:05:48.987: %DIAG_C10K-5-TESTING-PASSED: Field Diagnostics passed with the
selected test(s) for card in slot 8
Router# diagnostic ondemand iterations 3
Router# diagnostic start slot 8 test 1
Slot 8: Running test(s) 1 may generate packets out of the card interface.

Do you want to run the selected test(s)? [no]: y
Router#

FDIAG [slot 8]> Running Field Diagnostics [Iteration #1] ...
FDIAG [slot 8]> Running MPC860 Register Test {ID=1} ...
FDIAG [slot 8]> MPC860 Register Test {ID=1} passed

FDIAG [slot 8]> Running Field Diagnostics [Iteration #2] ...
FDIAG [slot 8]> Running MPC860 Register Test {ID=1} ...
FDIAG [slot 8]> MPC860 Register Test {ID=1} passed

FDIAG [slot 8]> Running Field Diagnostics [Iteration #3] ...
FDIAG [slot 8]> Running MPC860 Register Test {ID=1} ...
FDIAG [slot 8]> MPC860 Register Test {ID=1} passed

FDIAG [slot 8]> Total testing time = 00:00:00.600

FDIAG [slot 8]> Field Diagnostics passed with the selected test(s)

*Jun 13 16:06:07.291: %DIAG_C10K-5-TESTING-PASSED: Field Diagnostics passed with the
selected test(s) for card in slot 8
```

#### Related Commands<sup>A</sup>

| Command                                      | Description                                                                                                 |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>diagnostic event-log size</b>             | Sets the size of the event table.                                                                           |
| <b>diagnostic load</b>                       | Loads the Field Diagnostic image onto the line card.                                                        |
| <b>diagnostic ondemand action-on-failure</b> | Sets the number of errors allowed in the Field Diagnostic test before the Field Diagnostic test is stopped. |



| Command                                  | Description                                                                                                                                      |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>diagnostic ondemand iterations</b>    | Sets the number of times each specific Field Diagnostic test will be run when a Field Diagnostic test is initiated.                              |
| <b>diagnostic start</b>                  | Starts Field Diagnostic testing on the line card.                                                                                                |
| <b>diagnostic stop</b>                   | Stops an in-progress Field Diagnostic test.                                                                                                      |
| <b>show diagnostic content</b>           | Shows the Field Diagnostic test list for a particular line card.                                                                                 |
| <b>show diagnostic events</b>            | Displays the history of Field Diagnostic events since the last system reload.                                                                    |
| <b>show diagnostic ondemand settings</b> | Shows the diagnostic on-demand settings.                                                                                                         |
| <b>show diagnostic result</b>            | Shows the results of the Field Diagnostic test.                                                                                                  |
| <b>show diagnostic ood-status</b>        | Displays various status information, such as line card slot and name, Field Diagnostic image status, and previous Field Diagnostic test results. |

# diagnostic unload

To unload the Field Diagnostic on the line card and resume normal line card operation, enter the **diagnostic unload** command.

**diagnostic unload** { **slot** *slot-number* | **subslot** *slot-number/subslot-number* }

|                           |                       |                                                                                                                        |
|---------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>slot</b>           | Specifies that the line card unloading the Field Diagnostic image is in a full slot as opposed to a subslot.           |
|                           | <b>subslot</b>        | Specifies that the line card unloading the Field Diagnostic image is in a subslot as opposed to a full slot.           |
|                           | <i>slot-number</i>    | Specifies the number of the slot where the line card unloading the Field Diagnostic image is located on the router.    |
|                           | <i>subslot-number</i> | Specifies the number of the subslot where the line card unloading the Field Diagnostic image is located on the router. |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC (#)

|                        |                |                                                                |
|------------------------|----------------|----------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                            |
|                        | 12.2(16)BX     | This command was introduced.                                   |
|                        | 12.3(13)BC     | This command was integrated into Cisco IOS Release 12.3(13)BC. |

**Usage Guidelines** The **show diagnostic result** output will be lost once a Field Diagnostic image is successfully unloaded off a line card. If you want to retain the results of the Field Diagnostic test, enter **show diagnostic result** and copy the output into a separate file before entering **diagnostic unload** to unload the Field Diagnostic image off the line card.

Entering this command successfully will resume normal line card operation.

If a line card needs to be placed back online immediately and a Field Diagnostic test is in progress, enter **diagnostic stop** to stop the in-progress Field Diagnostic test before entering **diagnostic unload** to unload the Field Diagnostic image off the line card.

**Examples** In the following example, the Field Diagnostic image is unloaded off of the line card in slot 2. Note that the command is not successfully executed until confirmed at the screen prompt.

Router# **diagnostic unload slot 2**

```

WARNING:All Field Diagnostics test results and information will be
 unavailable to both the "show diagnostic result <target>" and
 "show diagnostic content <target>" commands.
 To save the test results, cancel the unloading process and enter
```

```

the "show diagnostic result <target>" command. Copy the output
into a file, then re-enter the "diagnostic unload <target>" command
to restore normal line card operation.

% Are you sure that you want to perform this operation? [no]:y
FDIAG [slot 2]> Unloading the Field Diagnostics image and restoring the original run-time
image, please wait ...

FDIAG [slot 2]> Field Diagnostics image was successfully unloaded

```

**Related Commands**

| Command                                      | Description                                                                                                                                      |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>diagnostic event-log size</b>             | Sets the size of the event table.                                                                                                                |
| <b>diagnostic load</b>                       | Loads the Field Diagnostic image onto the line card.                                                                                             |
| <b>diagnostic ondemand action-on-failure</b> | Sets the number of errors allowed in the Field Diagnostic test before the Field Diagnostic test is stopped.                                      |
| <b>diagnostic ondemand iterations</b>        | Sets the number of times each specific Field Diagnostic test will be run when a Field Diagnostic test is initiated.                              |
| <b>diagnostic start</b>                      | Starts Field Diagnostic testing on the line card.                                                                                                |
| <b>diagnostic stop</b>                       | Stops an in-progress Field Diagnostic test.                                                                                                      |
| <b>show diagnostic content</b>               | Shows the Field Diagnostic test list for a particular line card.                                                                                 |
| <b>show diagnostic events</b>                | Displays the history of Field Diagnostic events since the last system reload.                                                                    |
| <b>show diagnostic ondemand settings</b>     | Shows the diagnostic on-demand settings.                                                                                                         |
| <b>show diagnostic result</b>                | Shows the results of the Field Diagnostic test.                                                                                                  |
| <b>show diagnostic ood-status</b>            | Displays various status information, such as line card slot and name, Field Diagnostic image status, and previous Field Diagnostic test results. |

# docsis cvc mfg

To configure the access start times and organization name for the manufacturer’s code verification certificate (CVC) to enable the DOCSIS 1.1 secure software download feature on the router, use the **docsis cvc mfg** command in global configuration mode. To delete this information, use the **no** form of this command.

Cisco uBR905 and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter

```
docsis cvc mfg {codeAccessStart start-time | cvcAccessStart start-time | organization name}

no docsis cvc mfg {codeAccessStart start-time | cvcAccessStart start-time | organization name}
```

Syntax Description

|                                          |                                                                                                                           |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>codeAccessStart</b> <i>start-time</i> | Specifies the code Access Start Time as a UTC time value (YYMMDDhhmmssZ) in Greenwich Mean Time.                          |
| <b>cvcAccessStart</b> <i>start-time</i>  | Specifies the CVC Access Start Time as a UTC time value (YYMMDDhhmmssZ) in Greenwich Mean Time.                           |
| <b>organization</b> <i>name</i>          | Specifies the name of the manufacturer of the code file. Use quotes if the <i>name</i> value contains more than one word. |

Command Default

The **codeAccessStart** and **cvcAccessStart** times default to 011219000000Z (midnight on December 19, 2001 Greenwich Mean Time). The organization defaults to Cisco Systems.



Note

Typically, the default values should not be changed unless you are instructed to do so by Cisco TAC or field service engineers.

Command Modes

Global configuration

Command History

| Release    | Modification                                                                                                                     |
|------------|----------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)CZ | This command was introduced on the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

Usage Guidelines

This command configures the access start times and organization name that are required by Appendix D in the DOCSIS BPI+ specification. The time values are specified as UTC time values in Greenwich Mean Time, with a two-digit year. If the year is between 50 and 99, it is interpreted as 1950 to 1999. If the year is between 00 and 49, it is interpreted as 2000 to 2049.

The router uses the **codeAccessStart** value to verify the Code Verification Signature (CVS) that is affixed to the code file downloaded using the secure software download feature. The router uses the **cvcAccessStart** value to verify the CVC for the code file. The router also uses the **organization** value to verify that the code file has been created by the proper manufacturer.

**Tip**

These values are the same that are set using the docsBpi2CodeMfgCodeAccessStart, docsBpi2CodeMfgCvcAccessStart, and docsBpi2CodeMfgOrgName attributes in the BPI+ MIB (DOCS-BPI2-MIB).

**Examples**

The following example shows the default configuration for the **docsis cvc mfg** commands:

```
Router(config)# docsis cvc mfg organization "Cisco Systems"
Router(config)# docsis cvc mfg codeAccessStart 011219000000Z
Router(config)# docsis cvc mfg cvcAccessStart 011219000000Z
Router(config)#
```

**Note**

You must set the organization name using the **docsis cvc mfg organization** command before you can set either access start time.

**Related Commands**

| Command                | Description                                                                                                                |
|------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>docsis cvc mso</b>  | Configures the access start times and organization name for the optional MSO cosigned code verification certificate (CVC). |
| <b>docsis cvc test</b> | Tests the root CA public key and CM private key that are installed on the router.                                          |

# docsis cvc mso

To configure the access start times and organization name for the optional Multi-Service Operator (MSO) cosigned code verification certificate (CVC) for the DOCSIS 1.1 secure software download feature, use the **docsis cvc mso** command in global configuration mode. To delete the information, use the **no** form of this command.

**Cisco uBR905 and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter**

```
docsis cvc mso {codeAccessStart start-time | cvcAccessStart start-time | organization name}

no docsis cvc mso {codeAccessStart start-time | cvcAccessStart start-time | organization name}
```

## Syntax Description

|                                          |                                                                                                                           |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>codeAccessStart</b> <i>start-time</i> | Specifies the code Access Start Time as a UTC time value (YYMMDDhhmmssZ) in Greenwich Mean Time.                          |
| <b>cvcAccessStart</b> <i>start-time</i>  | Specifies the CVC Access Start Time as a UTC time value (YYMMDDhhmmssZ) in Greenwich Mean Time.                           |
| <b>organization</b> <i>name</i>          | Specifies the name of the manufacturer of the code file. Use quotes if the <i>name</i> value contains more than one word. |

## Command Default

No default values or behavior (no cosigner is used).

## Command Modes

Global configuration

## Command History

| Release    | Modification                                                                                                                     |
|------------|----------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)CZ | This command was introduced on the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

## Usage Guidelines

This command configures the optional cosigner access start times and organization name that are specified by Appendix D in the DOCSIS BPI+ specification. The time values are specified as UTC time values in Greenwich Mean Time, with a two-digit year. If the year is between 50 and 99, it is interpreted as 1950 to 1999. If the year is between 00 and 49, it is interpreted as 2000 to 2049.

You do not need to use this command unless the MSO or service provider is digitally signing the Cisco IOS software images that it plans to download to the Cisco cable modems. If so, then this command must be used to set the appropriate access times and organization name, so that the cable modem can properly authenticate the software images during a secure software download.

The router uses the **codeAccessStart** value to verify the cosigner’s Code Verification Signature (CVS) that is affixed to the code file downloaded using the secure software download feature. The router uses the **ccvAccessStart** value to verify the cosigner’s CVC that is affixed to the code file. The router also uses the **organization** value to verify that the code file has been signed by the proper MSO or cable operator.

**Tip**

These values are the same that are set using the `docsdocsBpi2CodeCoSignerCodeAccessStart`, `Bpi2CodeCoSignerCvcAccessStart`, and `docsBpi2CodeCoSignerOrgName` attributes in the BPI+ MIB (DOCS-BPI2-MIB).

**Examples**

The following example shows the **docsis cvc mso** commands being used to configure the router for a cosigned CVC from an organization named “MSO Organization” and with certificate access times of midnight on March 1, 2002 Greenwich Mean Time:

```
Router(config)# docsis cvc mfg organization "MSO Organization"
Router(config)# docsis cvc mfg codeAccessStart 020301000000Z
Router(config)# docsis cvc mfg cvcAccessStart 020301000000Z
Router(config)#
```

**Note**

You must set the organization name using the **docsis cvc mso organization** command before you can set either access start time.

**Related Commands**

| Command                | Description                                                                                                         |
|------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>docsis cvc mfg</b>  | Configures the access start times and organization name for the manufacturer’s code verification certificate (CVC). |
| <b>docsis cvc test</b> | Tests the root CA public key and CM private key that are installed on the router.                                   |

# docsis cvc test

To test the root CA public key and CM private key that are installed on the router, use the **docsis cvc test** command in global configuration mode.

Cisco uBR905 and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter

**docsis cvc test**

Syntax Description

This command has no arguments or keywords.

Command Default

No default behavior or values.

Command Modes

Global configuration

| Command History | Release    | Modification                                                                                                                     |
|-----------------|------------|----------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)CZ | This command was introduced on the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

Usage Guidelines

This command verifies that the root CA public key and the private key that are installed in the router at the factory are valid. The command uses the root CA public key to encrypt a string, and then it uses the router’s private key to decrypt the key.

Typically, the root CA public key and private key are installed at the factory and never need to be updated. However, DOCSIS allows the keys to be updated as part of the secure software download procedure. If this occurs, you can use the **docsis cvc test** command to verify that the keys are valid and are properly installed.

Examples

The following example shows a typical successful result of the **docsis cvc test** command:

```
Router# config terminal
Router(config)# docsis cvc test
Encrypted sting: This is a test
Encrypt result: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Decrypt result: This is a test
Router(config)#
```



Note

If the decrypt result is not “This is a test,” then the test failed, which indicates that either the public key or the private key is not valid.



| Related Commands | Command               | Description                                                                  |
|------------------|-----------------------|------------------------------------------------------------------------------|
|                  | <b>docsis cvc mfg</b> | Configures the manufacturer's CVC access start time and organization values. |
|                  | <b>docsis cvc mso</b> | Configures the MSO cosigned CVC access start time and organization values.   |

# docsis-policy

To assign a policy to a DOCSIS load balancing group, use the **docsis-policy** command in the config-lb-group configuration mode. The policy becomes the default policy assigned to the CM, if the CM does not choose a different policy. To remove the assigned policy, use the **no** form of this command.

**docsis-policy** *n*

**no docsis-policy**

|                           |          |                                                                                       |
|---------------------------|----------|---------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>n</i> | Load balancing group policy number. The policy number can range from 0 to 4294967295. |
|---------------------------|----------|---------------------------------------------------------------------------------------|

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                                                    |
|----------------------|----------------------------------------------------|
| <b>Command Modes</b> | DOCSIS load balancing group mode (config-lb-group) |
|----------------------|----------------------------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCC    | This command was introduced. |

|                 |                                                                                                                                          |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to assign a policy to a DOCSIS load balancing group on the CMTS, using the <b>docsis-policy</b> command. |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# docsis-policy 1
Config: Last Batch 0, 63 bytes
cable load-balance docsis-group 1 index 81
docsis-policy 1
end
```

| <b>Related Commands</b> | <b>Command</b>                              | <b>Description</b>                                                                                                      |
|-------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                         | <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
|                         | <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |

# docsis-version

To configure the DOCSIS version of the CM for the CMTS tag, use the **docsis-version** command in the cmts-tag configuration mode. To remove the configured DOCSIS version from the CMTS tag, use the **no** form of this command.

**[exclude] docsis-version** *docsis-version*

**no docsis-version** *docsis-version*

| Syntax Description | exclude               | (Optional) Configures the CMTS tag to exclude the specified DOCSIS version.                                                                                                                                                                                                                                                                        |
|--------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>docsis-version</i> | DOCSIS version for the CMTS tag. You can select one of the following DOCSIS versions to match the DOCSIS modems: <ul style="list-style-type: none"> <li>docsis10 - Matches DOCSIS 1.0 modems</li> <li>docsis11 - Matches DOCSIS 1.1 modems</li> <li>docsis20 - Matches DOCSIS 2.0 modems</li> <li>docsis30 - Matches DOCSIS 3.0 modems.</li> </ul> |

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                          |
|----------------------|--------------------------|
| <b>Command Modes</b> | CMTS tag mode (cmts-tag) |
|----------------------|--------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

**Examples** The following example shows how to configure the specified DOCSIS version for the CMTS tag using the **docsis-version** command:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable tag 1
Router(cmts-tag)# docsis-version docsis10
```

| Related Commands | Command                                     | Description                                                                                                              |
|------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance docsis-group</b>      | To configure a DOCSIS load balancing group on the CMTS.                                                                  |
|                  | <b>show cable load-balance docsis-group</b> | To display real-time configuration, statistical and operational information for load balancing operations on the router. |
|                  | <b>cable tag</b>                            | To configure a tag for a DOCSIS load balancing group on the CMTS.                                                        |

# download

To create a DOCSIS configuration file that instructs the CM to download a new software image, use the **download** command in cable config-file configuration mode. To disable the specification, use the **no** form of this command.

**download** { *image filename* [*oui oui-list*] | *server ip-address* }

**no download** { *image filename* [*oui oui-list*] | *server ip-address* }



## Note

Because of conflicts with other Cisco IOS commands, you cannot abbreviate the **no** form of this command. You must specify the complete command name and option, such as **no download image** or **no download server**.

## Syntax Description

|                          |                                                                                                                                                                                                                                                    |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>image filename</b>    | Specifies to download an image file.                                                                                                                                                                                                               |
| <b>oui oui-list</b>      | Specifies the list of Organizational Unique Identifiers (OUIs), up to a maximum of 8. (An OUI is the first 3 octets of the CM MAC address and typically indicates the vendor for the CM.)                                                          |
| <b>Tip</b>               | The Institute of Electrical and Electronics Engineers (IEEE) is the official issuer of OUI values. The IEEE OUI web site is at <a href="http://standards.ieee.org/regauth/oui/index.shtml">http://standards.ieee.org/regauth/oui/index.shtml</a> . |
| <b>server ip-address</b> | Specifies the TFTP server IP address. If no IP address is specified, the CM defaults to using the same TFTP server that provided the configuration file.                                                                                           |

## Command Default

The CM does not download a new software image.

## Command Modes

Cable config-file configuration

## Command History

| Release    | Modification                                    |
|------------|-------------------------------------------------|
| 12.1(2)EC1 | This command was introduced.                    |
| 12.2(4)BC1 | Support was added to the Release 12.2 BC train. |

## Usage Guidelines

This command sets the Software Upgrade Filename and Software Upgrade TFTP Server fields in the DOCSIS configuration file. The DOCSIS specification allows the DOCSIS configuration file to specify that the CM must be running a particular software image. If the CM is not currently using that image, it must then download the image before continuing the registration process. For security, performance, and scalability reasons, a particular TFTP server can be specified from which the CM must download the new software image.

The *filename* specified by **download image** command must be a fully qualified file and pathname that exactly matches the file and pathname as they exist on the TFTP download server. For example, if the software image is named *ubr920-k1v4y556i-mz* and is in a subdirectory named *cisco\_cms* on the TFTP server, the filename specified with this command should be *cisco\_cms/ubr920-k1v4y556i-mz*.

If the *oui-list* parameter is specified, the **download image** filename is provided only to the CMs that contain those particular OUIs. This helps ensure that the CM does not download a software image that is intended for another vendor's CMs.

**Note**

For each configuration file, multiple download images can be specified. Because each filename can be listed only once, entering a different list of OUIs for a single filename clears the old list. To support more than eight OUIs with the same file, use a different download software image name, and create a duplicate file or alias on the TFTP server.

The **download server** command is not required. If it is not specified, the CM uses the same server that provided its DOCSIS configuration file. However, the **download server** command requires that the image filename also be specified using the **download image** command.

**Examples**

The following command shows how to setup a DOCSIS configuration file so that the cable modem will upgrade its software image:

```
Router(config)# cable config-file upgrade.cm
Router(config-file)# download image ubr920-k1v4y556i-mz.121-3a.T1 oui 00.50.73 00.D0.BA
00.D0.58 00.01.96
Router(config-file)# download server 10.15.24.33
Router(config-file)# exit
Router(config)#
```

**Related Commands**

| Command                  | Description                                                             |
|--------------------------|-------------------------------------------------------------------------|
| <b>cable config-file</b> | Creates a DOCSIS configuration file and enters configuration file mode. |
| <b>access-denied</b>     | Disables access to the network.                                         |
| <b>channel-id</b>        | Specifies upstream channel ID.                                          |
| <b>cpe max</b>           | Specifies CPE information.                                              |
| <b>frequency</b>         | Specifies downstream frequency.                                         |
| <b>option</b>            | Provides config-file options.                                           |
| <b>privacy</b>           | Specifies privacy options for baseline privacy images.                  |
| <b>service-class</b>     | Specifies service class definitions for the configuration file.         |
| <b>snmp manager</b>      | Specifies Simple Network Management Protocol (SNMP) options.            |
| <b>timestamp</b>         | Enables time-stamp generation.                                          |

# downstream

To set downstream radio frequency (RF) channels, use the **downstream** command in the config-lb-group configuration mode. To reset the downstream RF channels, use the **no** form of this command.

## Cisco uBR7200 Series Routers

**downstream cable** {slot/port}

**no downstream cable** {slot/port}

## Cisco uBR10012 Router

**downstream** {cable {slot/subslot/port} | **Integrated-Cable** {slot/subslot/bay} {rf-channel group list} | **Modular-Cable** {slot/subslot/bay} {rf-channel group list}}

**no downstream** {cable {slot/subslot/port} | **Integrated-Cable** {slot/subslot/bay} {rf-channel group list} | **Modular-Cable** {slot/subslot/bay} {rf-channel group list}}

| Syntax Description                                                    |  |                                                                                                                                                                                                     |
|-----------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b> {slot/port}                                              |  | Specifies the CMTS interface slot and port numbers.                                                                                                                                                 |
| <b>cable</b><br>{slot/subslot/port}                                   |  | Specifies the CMTS interface slot, subslot, and port numbers.                                                                                                                                       |
| <b>Integrated-Cable</b><br>{rf-channel group list} {slot/subslot/bay} |  | Specifies the integrated cable interface with the list of port numbers that range in the associated RF channel. Slot, subslot, and bay numbers of the integrated cable interface is also specified. |
| <b>Modular-Cable</b><br>{rf-channel group list} {slot/subslot/bay}    |  | Specifies the modular cable interface with the list of port numbers that range in the associated RF channel. It also specifies slot, subslot, and bay numbers of the modular cable interface.       |

**Command Default** No default behavior or values.

**Command Modes** DOCSIS load balancing group mode (config-lb-group)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

**Examples** The following example shows how to set downstream RF channels to a DOCSIS load balancing group on the CMTS, using the **downstream** command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# downstream cable 1/1
Router(config-lb-group)# downstream Integrated-Cable 5/0/0 rf-channel 2
Router(config-lb-group)# downstream Modular-Cable 1/0/0 rf-channel 4
```

| Related Commands | Command                                             | Description                                                                                                             |
|------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance<br/>docsis-group</b>          | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
|                  | <b>show cable<br/>load-balance<br/>docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |

# downstream cable

To assign a primary downstream channel for a fiber node, use the **downstream cable** command in cable fiber-node configuration mode. To remove a primary downstream channel for a fiber node, use the **no** form of the command.

```
downstream cable slot/subslot/port
no downstream cable slot/subslot/port
```

Syntax Description

|         |                                                                                                |
|---------|------------------------------------------------------------------------------------------------|
| slot    | The slot used for the cable interface line card. Valid values are 5 to 8.                      |
| subslot | The subslot used for the cable interface line card. Valid values are 0 or 1.                   |
| port    | The downstream port that can be used as a primary downstream channel. Valid values are 0 to 4. |

Command Default

If the **downstream cable** command is not issued, no primary downstream channel is assigned to the fiber node.

Command Modes

Cable fiber-node configuration

Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the uBR10012 router.            |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

Usage Guidelines

For each fiber node, a traditional DOCSIS downstream channel is used to carry MAC management and signaling messages, and the associated traditional DOCSIS upstream channel is used for return data traffic and signaling. The traditional DOCSIS downstream channel used in this way is called the *primary downstream channel*.

The **downstream cable** command assigns a primary downstream channel for a fiber node. Each fiber node must be assigned at least one primary downstream channel and can be assigned multiple primary downstream channels. Cisco IOS software decides which primary downstream channel to use for the fiber node from the set of channels assigned with **downstream cable**. Assigning more than one primary channel to a fiber node with the **downstream cable** command can be useful for load-balancing purposes.



Note

If the primary downstream channel for the fiber node is assigned from a SPA downstream, then the **downstream cable** command is not required.

If a wideband-capable modem registers as a traditional DOCSIS 2.0 modem, it will register on a downstream channel as follows:

- If the modem’s fiber node has been assigned a primary downstream channel with the **downstream cable** command, the modem registers on that downstream channel.



If the modem's fiber node has not been assigned a primary downstream channel with the **downstream cable** command, the modem can register on any downstream channel that is visible to it.

For more information on using this command, refer to the *Cisco uBR10012 Universal Broadband Router SIP and SPA Software Configuration Guide*.

### Examples

The following example shows how to assign a primary downstream channel for fiber node 5. The primary downstream channel is the downstream port located on the cable interface line card at slot/subslot/port 6/0/0.

```
Router# configure terminal
Router(config)# cable fiber-node 5
Router(config-fiber-node)# downstream cable 6/0/0
```

### Related Commands

| Command                                    | Description                                                                         |
|--------------------------------------------|-------------------------------------------------------------------------------------|
| <b>cable fiber-node</b>                    | Enters cable fiber-node configuration mode so that you can configure a fiber node.  |
| <b>description (cable fiber-node)</b>      | Specifies a description for a fiber node.                                           |
| <b>downstream modular-cable rf-channel</b> | Specifies the RF channels that are available for wideband channels on a fiber node. |
| <b>upstream cable connector</b>            | Specifies the upstream channel ports for a fiber node.                              |

# downstream integrated-cable rf-channel (interface)

To associate a set of upstream channels to the integrated downstream channels, use the **downstream integrated-cable rf-channel** command in interface configuration mode.

**downstream integrated-cable** *slot/card/port* **rf-channel** *rf-channels* [**upstream group***list*]

|                    |                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <div> <div><i>slot</i></div> <div>Identifies the chassis slot where the Cisco cable interface line card resides.</div> <div> <ul style="list-style-type: none"> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> </ul> </div> </div> |
|                    | <div> <div><i>card</i></div> <div>(Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.</div> </div>                                                                                                                                                                                                                     |
|                    | <div> <div><i>port</i></div> <div>Downstream port number.</div> <div> <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4.</li> </ul> </div> </div>                                                                                             |
|                    | <div> <div><b>rf-channel</b> <i>rf-channel</i></div> <div>Specifies association of the downstream channels to the channel group descriptor. The valid range is from 0 to 3.</div> </div>                                                                                                                                                                                        |
|                    | <div> <div><b>upstream group</b><i>list</i></div> <div>Specifies the logical identifier of upstream channels serving these downstream RF channels. The valid range is from 0 to 7.</div> </div>                                                                                                                                                                                 |

|                 |                                                                                      |
|-----------------|--------------------------------------------------------------------------------------|
| Command Default | No default upstream channels are configured with the integrated downstream channels. |
|-----------------|--------------------------------------------------------------------------------------|

|               |                                     |
|---------------|-------------------------------------|
| Command Modes | Interface configuration (config-if) |
|---------------|-------------------------------------|

| Command History | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>12.2(33)SCB</td><td>This command was introduced.</td></tr> </table> | Release | Modification | 12.2(33)SCB | This command was introduced. |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-------------|------------------------------|
| Release         | Modification                                                                                                                         |         |              |             |                              |
| 12.2(33)SCB     | This command was introduced.                                                                                                         |         |              |             |                              |

## Examples

The following example shows how to use the **downstream integrated-cable rf-channel** command on the Cisco uBR10012 router.

```
Router# configure terminal
Router(config)# interface cable 7/0/0
Router(config-if)# downstream integrated-cable 7/0/0 rf-channel 1 upstream 1
```

## Associated Features

The **downstream integrated-cable rf-channel** command is used to configure the following:

- [Configuring the Cisco UBR-MC20X20V Cable Interface Line Card](#)
- [Configuring the Cisco uBR-MC88V Cable Interface Line Card](#)

## Related Commands

| Command                         | Description                                                                |
|---------------------------------|----------------------------------------------------------------------------|
| <b>cable upstream max-ports</b> | Configures the maximum number of upstreams on a MAC domain on a line card. |

# downstream local upstream

To restrict the set of Cisco uBR10-MC5X20 upstreams associated with the Cisco uBR10-MC5X20 downstreams, use the **downstream local upstream** command in interface configuration mode.

**downstream local upstream** *group***list**

|                           |                          |                                                                                               |
|---------------------------|--------------------------|-----------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>group</i> <b>list</b> | Specifies the number of upstreams associated with the Cisco uBR10-MC5X20 downstream channels. |
|---------------------------|--------------------------|-----------------------------------------------------------------------------------------------|

|                        |                                                                                                 |  |
|------------------------|-------------------------------------------------------------------------------------------------|--|
| <b>Command Default</b> | All upstreams under the cable interface are associated with the Cisco uBR10-MC5X20 downstreams. |  |
|------------------------|-------------------------------------------------------------------------------------------------|--|

|                      |                                          |  |
|----------------------|------------------------------------------|--|
| <b>Command Modes</b> | Interface configuration mode (config-if) |  |
|----------------------|------------------------------------------|--|

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.      |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. |

|                         |                                                                                                                                                                                                |  |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Usage Guidelines</b> | Use this command to restrict a set of Cisco uBR10-MC5X20 upstreams to Cisco uBR10-MC5X20 downstreams. This restricts MAC management messages (MMM) to be sent to the specified upstreams only. |  |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

|                 |                                                                                                                    |  |
|-----------------|--------------------------------------------------------------------------------------------------------------------|--|
| <b>Examples</b> | The following example shows how the <b>downstream local upstream</b> command is used in the Cisco uBR10012 router. |  |
|-----------------|--------------------------------------------------------------------------------------------------------------------|--|

```
Router# configure terminal
Router (config)# interface cable 5/1/0
Router(config-if)# downstream local upstream 0-1
```

| Related Commands | Command                 | Description                                            |
|------------------|-------------------------|--------------------------------------------------------|
|                  | <b>downstream cable</b> | Assigns a primary downstream channel for a fiber node. |

# downstream modular-cable rf-channel (interface)

To associate a set of Cisco uBR10-MC5X20 upstreams with individual modular downstream channels from the SPA into a given cable MAC domain, use the **downstream modular-cable rf-channel** command in interface configuration mode.

## Cisco IOS Release 12.3(23)BC

**downstream modular-cable** *slot/subslot/bay* **rf-channel** *rf channels* [**upstream grouplist**]

## Cisco IOS Release 12.2(33)SCB and later

**downstream modular-cable** *slot/bay/port* **rf-channel** *rf channels* [**upstream grouplist**]

## Cisco IOS Release 12.2(33)SCE and later

**downstream modular-cable** *slot/subslot/controller* **rf-channel** *rf channels* [**upstream grouplist**]

| Syntax Description |                                                                                                                                                                                                                    |  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <i>slot</i>        | Slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs.                                                                                                                        |  |
|                    | For the Cisco uBR-MC3GX60V cable interface line card, the cable interface slot values range from 5 to 8.                                                                                                           |  |
| <i>subslot</i>     | Subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.                                                                                                                          |  |
| <i>bay</i>         | Bay in a SIP where a SPA is located. The valid values are 0 (upper bay) and 1 (lower bay).                                                                                                                         |  |
| <i>port</i>        | Interface number on the SPA.                                                                                                                                                                                       |  |
| <i>controller</i>  | Modular-Cable controller number. The valid values are 0 to 2.                                                                                                                                                      |  |
|                    | <b>Note</b> This option is available only on the Cisco uBR-MC3GX60V cable interface line card and on the Cisco router running Cisco IOS Release 12.2(33)SCE and later releases.                                    |  |
| <b>rf-channel</b>  | Specifies the association of a continuous range of RF channels within the SPA downstream.                                                                                                                          |  |
| <i>rf channels</i> | Range of RF channel physical ports on the SPA FPGA.                                                                                                                                                                |  |
| <b>upstream</b>    | Specifies a set of ranges of upstream to allow association of a noncontiguous list of upstreams to one or more SPA downstreams. If the range is not specified, all the upstreams in the MAC domain are associated. |  |
| <i>grouplist</i>   | Number of upstreams with the modular cable downstream channel.                                                                                                                                                     |  |

**Command Default** By default, all upstream channels in an interface are associated with the modular downstream channels in the same interface.

**Command Modes** Interface configuration (config-if)

## ■ downstream modular-cable rf-channel (interface)

## Command History

| Release     | Modification                                                                                                                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                       |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for the modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |
| 12.2(33)SCE | This command was modified to change the valid range of <i>slot</i> .                                                                                                                                             |

## Usage Guidelines

Use this command to create primary-capable channels by associating a single or a set of Cisco uBR10-MC 5X20 upstream channels with individual modular downstream channels on a fiber node. When a primary-capable channel is created, the same modular downstream channel cannot be used as a primary-capable channel in another MAC domain. However, it can be used as non-primary-capable channel in another MAC domain.

## Examples

The following example shows how to use the **downstream modular-cable rf-channel** command on the Cisco uBR10012 router.

```
Router# configure terminal
Router (config)# interface cable 5/1/0
Router(config-if)# downstream modular-cable 1/0/0 rf-channel 0-2 upstream 0-1 4-5
```

## Related Commands

| Command                                       | Description                                                                         |
|-----------------------------------------------|-------------------------------------------------------------------------------------|
| <b>downstream modular-cable rf-channel</b>    | Specifies the RF channels that are available for wideband channels on a fiber node. |
| <b>rf-channel cable downstream channel-id</b> | Assigns a downstream channel ID to an RF channel.                                   |

# downstream modular-cable rf-channel

To specify the RF channels that are available for wideband channels on a fiber node, use the **downstream modular-cable rf-channel** command in cable fiber-node configuration mode. To remove RF channels that are available for wideband channels on a fiber node, use the **no** form of this command.

## Cisco IOS Release 12.3(23)BC

**downstream modular-cable** *slot/subslot/bay* **rf-channel** {*rf-port* | *low-high*}

**no downstream modular-cable** *slot/subslot/bay* **rf-channel** {*rf-port* | *low-high*}

## Cisco IOS Release 12.2(33)SCB

**downstream modular-cable** *slot/bay/port* **rf-channel** {*rf-port* | *low-high*}

**no downstream modular-cable** *slot/bay/port* **rf-channel** {*rf-port* | *low-high*}

### Syntax Description

|                 |                                                                                                                                                                            |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>     | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs.                                                                            |
| <i>subslot</i>  | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.                                                                              |
| <i>bay</i>      | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).                                                                                 |
| <i>port</i>     | Specifies the interface number on the SPA.                                                                                                                                 |
| <i>rf-port</i>  | Specifies the RF channel physical port on the Wideband SPA FPGA. Valid values for <i>rf-port</i> depend on the configuration set with the <b>annex modulation</b> command. |
| <i>low-high</i> | A range of RF channel physical ports on the Wideband SPA FPGA. The <i>low</i> and <i>high</i> values are separated by a hyphen.                                            |

### Command Default

If the **downstream modular-cable rf-channel** command is not issued, no RF channels are configured for wideband channels on the fiber node.

### Command Modes

Cable fiber-node configuration (fiber-node)

### Command History

| Release     | Modification                                                                                                                                     |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                       |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                  |
| 12.2(33)SCB | This command was modified to change the addressing format for the modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

**Usage Guidelines**

The **downstream modular-cable rf-channel** command makes RF channels available for use on a fiber node. Fiber node software configuration mirrors the physical topology of the cable network. The **cable rf-channel** command configures the RF channels that will be used for a wideband channel on a Wideband SPA.

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command.

**Note**

Effective with Cisco IOS Release 12.3(23)BC, the **annex modulation** command is obsolete and **annex** and **modulation** are included as keyword options in the **rf-channel frequency** command.

- For annex A and 256 QAM, each Wideband SPA supports 18 RF channels. In this case, valid values for the *rf-port* argument are 0 to 17.
- For all other cases, the SPA supports 24 RF channels. In these cases, valid values for the *rf-port* argument are 0 to 23.

A fiber node can be configured to have RF channels from one or both Wideband SPAs. However, a wideband channel cannot be comprised of RF channels from two different SPAs.

Each time the **downstream modular-cable rf-channel** command is issued for a fiber node, the set of RF channels that are available for use on that fiber node is *added to in a cumulative manner*. For example, if the following **downstream modular-cable rf-channel** commands were issued, the set of RF channels available for fiber node 1 is RF channels 0 to 10 on the Wideband SPA in slot/subslot/bay 1/0/0.

```
Router# configure terminal
Router(config)# cable fiber-node 1
Router(config-fiber-node)# downstream modular-cable 1/0/0 rf-channel 0-5
Router(config-fiber-node)# downstream modular-cable 1/0/0 rf-channel 6-10
```

**Examples**

The following example shows how to specify that RF channels 0 to 7 on a Wideband SPA will be available for use on fiber node 5. The Wideband SPA is located in slot/subslot/bay 1/0/0.

```
Router# configure terminal
Router(config)# cable fiber-node 5
Router(config-fiber-node)# downstream modular-cable 1/0/0 rf-channel 0-7
```

**Related Commands**

| Command                               | Description                                                           |
|---------------------------------------|-----------------------------------------------------------------------|
| <b>cable fiber-node</b>               | Enters cable fiber-node configuration mode to configure a fiber node. |
| <b>description (cable fiber-node)</b> | Specifies a description for a fiber node.                             |
| <b>downstream cable</b>               | Assigns a primary downstream channel for a fiber node.                |
| <b>upstream cable connector</b>       | Specifies the upstream channel ports for a fiber node.                |



# duration

To specify the time period and sample rate to be used for monitoring subscribers, use the **duration** command in enforce-rule configuration mode. To reset an enforce-rule to its default values, use the **no** form of this command.

**duration** *minutes* **avg-rate** *rate* **sample-interval** *minutes* [**penalty** *minutes*] { **upstream** | **downstream** } [**enforce**]

**no duration**

| Syntax Description                    |  |                                                                                                                                                                               |
|---------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>minutes</i>                        |  | Specifies the size of the sliding window (in minutes) during which subscriber usage is monitored. The valid range is 10 to 44640 with a default of 360 (6 hours).             |
| <b>avg-rate</b> <i>rate</i>           |  | Specifies the average sampling rate in kilobits per second for the specified duration. The valid range is 1 to 400000 kilobits with no default.                               |
| <b>sample-interval</b> <i>minutes</i> |  | Specifies how often (in minutes) the CMTS router should sample a service flow to get an estimate of subscriber usage. The valid range is 1 to 30, with a default value of 15. |
| <b>penalty</b> <i>minutes</i>         |  | (Optional) Specifies the period (in minutes) during which a cable modem (CM) can be under penalty. The valid range is 1 to 10080.                                             |
| <b>upstream</b>                       |  | Specifies monitoring of traffic in the upstream direction.                                                                                                                    |
| <b>downstream</b>                     |  | Specifies monitoring of traffic in the downstream direction.                                                                                                                  |
| <b>enforce</b>                        |  | (Optional) Specifies that the enforce-rule QoS profile should be applied automatically if a user violates their registered QoS profile.                                       |

**Command Default** The **duration** value defaults to 360 minutes (6 hours), and the **sample-interval** value defaults to 15 minutes.

**Command Modes** Enforce-rule configuration (enforce-rule)

| Command History | Release      | Modification                                                                                                       |
|-----------------|--------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(9a)BC   | This command was introduced. This command replaces the <b>monitoring-duration</b> command.                         |
|                 | 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
|                 | 12.2(33)SCD2 | The <b>penalty</b> keyword option was added.                                                                       |

## Usage Guidelines



### Note

This command is applicable only after the **monitoring-basics** command is configured with the keyword **legacy**.

When you enable an enforce-rule, the CMTS router periodically checks the bandwidth being used by subscribers to determine whether any subscribers are consuming more bandwidth than that specified by the avg-rate configured in enforce-rule. The CMTS router keeps track of subscribers using a sliding window that begins at each sample interval and continues for the duration period and average rate.

For example, with the default sample interval of 15 minutes and the default sliding window period of 360 minutes, the CMTS router samples the bandwidth usage every 15 minutes and counts the total bytes transmitted at the end of each 360-minute period. Each sample interval begins a new sliding window period for which the CMTS router keeps track of the total bytes transmitted.



### Note

Changing the **duration** *minutes*, **avg-rate** *rate*, or **sample-interval** *minutes* values resets the byte counters for that particular enforce-rule and begins a new sliding window period.

When you change the configuration of a currently active enforce-rule, that rule begins using the new configuration immediately to manage the cable modems tracked by this enforce-rule.

The **penalty** duration, which is configured using this command, is unique to weekdays, and takes precedence over the global penalty duration configured using the **penalty-period** command.

When you use the **show running-configuration** command to display the configuration, the keyword options for the **duration** command are truncated. In the following example, “pen” represents **penalty**, “do” represents **downstream**, and “enf” represents **enforce**:

```
Router# show running-configuration
.
.
.
duration 10 avg-rate 1 sample-interval 10 pen 11 do enf
```

For more information about the Subscriber Traffic Management feature and to see an illustration of a sample monitoring window, refer to the Subscriber Traffic Management for the Cisco CMTS Routers feature document on Cisco.com.

## Examples

The following example shows an enforce-rule being configured for a sliding window that is 20 minutes in length, an **avg-rate** of 1 kilobit per second, and a sampling interval of every 10 minutes.

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# duration 20 avg-rate 1 sample-interval 10 penalty 11 do enf
```

## Related Commands

| Command                       | Description                                                                                                                               |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos enforce-rule</b> | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>enabled (enforce-rule)</b> | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.                                                |

| Command                                  | Description                                                                                                                                                                            |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>debug cable subscriber-monitoring</b> | Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.                                                                                      |
| <b>monitoring-basics</b>                 | Specifies the type of monitoring for subscriber traffic management on a Cisco CMTS router.                                                                                             |
| <b>peak-time1</b>                        | Specifies peak and offpeak monitoring times on a Cisco CMTS router.                                                                                                                    |
| <b>penalty-period</b>                    | Specifies the period for which an enforced quality of service (QoS) profile should be in force for subscribers who violate their registered QoS profile.                               |
| <b>qos-profile registered</b>            | Specifies the registered QoS profile that should be used for this enforce-rule. This command is applicable only for DOCSIS 1.0 cable modems.                                           |
| <b>qos-profile enforced</b>              | Specifies a QoS profile that should be enforced when users violate their registered QoS profile. This command is applicable only for DOCSIS 1.0 cable modems.                          |
| <b>service-class (enforce-rule)</b>      | Specifies a service class (enforced or registered) that should be used for cable modem monitoring in an enforce-rule. This command is applicable for DOCSIS 1.1 or later cable modems. |
| <b>show cable qos enforce-rule</b>       | Displays the QoS enforce-rules that are currently defined.                                                                                                                             |
| <b>show cable subscriber-usage</b>       | Displays subscribers who are violating their registered QoS profiles.                                                                                                                  |
| <b>weekend duration</b>                  | Configures different subscriber monitoring options over weekends on a Cisco CMTS router.                                                                                               |

# enabled (enforce-rule)

To activate an enforce-rule and begin subscriber traffic management on a Cisco CMTS router, use the **enabled** command in enforce-rule configuration mode. To disable the enforce-rule without deleting it, use the **no** form of this command.

**enabled**

**no enabled**

**Syntax Description** This commands has no keywords or arguments.

**Command Default** Enforce-rules are disabled.

**Command Modes** Enforce-rule configuration (enforce-rule)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced.                                                                                       |
| 12.3(9a)BC  | This command was integrated into Cisco IOS Release 12.3(9a)BC.                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB.                                                    |

## Usage Guidelines

An enforce-rule is created and configured using the **cable qos enforce-rule** command, but it is not activated until you run the **enabled** command. Use the **no enabled** command to disable an enforce-rule without removing it from the CMTS configuration. When you disable an enforce-rule, all cable modems with that rule's registered QoS profile are no longer tracked by the Subscriber Traffic Management feature and all cable modems in penalty are moved to their registered QoS profile.

## Examples

The following example shows an enforce-rule being enabled:

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# enabled
```

The following example shows an enforce-rule being disabled. The rule remains in the CMTS configuration file.

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# no enabled
```

## Related Commands

| Command                            | Description                                                                                                                               |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos enforce-rule</b>      | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>qos-profile enforced</b>        | Specifies a QoS profile that should be enforced when users violate their registered QoS profiles.                                         |
| <b>duration</b>                    | Specifies the time period and sample rate to be used for monitoring subscribers.                                                          |
| <b>penalty-period</b>              | Specifies the time period that an enforced QoS profile should be in effect for subscribers that violate their registered QoS profiles.    |
| <b>qos-profile registered</b>      | Specifies the registered QoS profile that should be use for this enforce-rule.                                                            |
| <b>show cable qos enforce-rule</b> | Displays the QoS enforce-rules that are currently defined.                                                                                |
| <b>show cable subscriber-usage</b> | Displays subscribers who are violating their registered QoS profiles.                                                                     |

# enforced qos-profile

**Note**

Effective with Cisco IOS Release 12.3(9a)BC, the **enforced qos-profile** command is replaced by the **qos-profile enforced** command.

To specify a quality of service (QoS) profile that should be enforced when users violate their registered QoS profiles, use the **enforced qos-profile** command in enforce-rule configuration mode. To delete the enforced QoS profile from the enforce-rule, use the **no** form of this command.

**enforced qos-profile** *profile-id* [**no-persistence**]

**no enforced qos-profile** *profile-id* [**no-persistence**]

**Syntax Description**

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>profile-id</i>     | Specifies the QoS profile to be enforced. The valid range is 0 to 16383, with a default of 0.                                                                                                                                                                                                                                                                                                                                                     |
| <b>no-persistence</b> | (Optional) Specifies that the enforced QoS profile should not remain in force when a cable modem reboots. Instead, when a cable modem (CM) that is in the penalty period reboots, it is automatically removed from the penalty period and assigned the QoS profile that is specified in its DOCSIS configuration file.<br><br>The default is without this option, so that enforced QoS profiles remain in effect for cable modems across reboots. |

**Command Default**

The profile ID defaults to 0, and enforced QoS profiles are persistent across cable modem reboots.

**Command Modes**

Enforce-rule configuration (enforce-rule)

**Command History**

| Release     | Modification                                                          |
|-------------|-----------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced.                                          |
| 12.3(9a)BC  | This command was replaced by the <b>qos-profile enforced</b> command. |

**Usage Guidelines**

Both the originally provisioned QoS profile and the enforced QoS profile must be created on the Cisco CMTS router. This command does not support profiles that are created by the cable modem.

An enforce-rule can specify an enforced QoS profile, which is automatically applied to subscribers that transmit more traffic than what is allowed by their registered QoS profile. The enforced QoS profile remains in effect during the penalty time period (see the **penalty-period** command). At the end of the penalty period, the subscriber returns to their registered QoS profile.

If a cable modem reboots while it is in its penalty time period, it continues using the enforced QoS profile, unless the service provider has manually changed the cable modem's registered QoS profile using the **cable modem qos profile** command.

When you change the enforced QoS profile for a currently active enforce-rule, any cable modems using this rule that are currently in the penalty period continue using the previously configured enforced QoS profile. Any cable modems that enter the penalty period after this configuration change, however, use the new enforced QoS profile.

An enforced QoS profile must already have been created on the Cisco CMTS router before you can assign it to an enforce-rule. If the rule does not exist, the system displays an error message.

When the **no-persistence** option is specified, the enforced QoS profile is still automatically applied to subscribers that violate their bandwidth requirements. However, when the cable modem reboots, the Cisco CMTS router allows the cable modem to use the QoS profile that is specified in its DOCSIS configuration file.

The **no-persistence** option can be used when initially using subscriber traffic management to identify potential problem applications and users. When repeat offenders are identified, they can then be assigned enforce-rules that do not use the **no-persistence** option, so that they remain in the penalty period even if they reboot their cable modems.

**Note**

In software releases prior to Cisco IOS Release 12.3(9a)BC, the system automatically applies the enforced QoS profile to violators only if the **enforce** keyword has been used with the **activate-rule at-byte-count** command.

**Examples**

The following example shows profile 12 being assigned as the enforced QoS profile to an enforce-rule:

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# enforced qos-profile 12
```

The following example shows profile 12 being assigned as the enforced QoS profile to an enforce-rule, but with the **no-persistence** option specified, so that the enforced QoS profile does not remain in force if the cable modem reboots:

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# enforced qos-profile 12 no-persistence
```

The following example shows the error message that is displayed when the specified QoS profile does not exist on the CMTS:

```
Router# configure terminal
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# enforced qos-profile 98
```

The qos profile 98 doesn't exist or it's a cm created QoS profile

**Related Commands**

| Command                            | Description                                                                                                                               |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>activate-rule at-byte-count</b> | Specifies the number of bytes that a subscriber can transmit during the monitoring period on a Cisco CMTS router.                         |
| <b>cable qos enforce-rule</b>      | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>enabled (enforce-rule)</b>      | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.                                                |

| Command                            | Description                                                                                                                            |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>duration</b>                    | Specifies the time period and sample rate to be used for monitoring subscribers.                                                       |
| <b>penalty-period</b>              | Specifies the time period that an enforced QoS profile should be in effect for subscribers that violate their registered QoS profiles. |
| <b>qos-profile registered</b>      | Specifies the registered QoS profile that should be used for this enforce-rule.                                                        |
| <b>show cable qos enforce-rule</b> | Displays the QoS enforce-rules that are currently defined.                                                                             |
| <b>show cable subscriber-usage</b> | Displays subscribers who are violating their registered QoS profiles.                                                                  |



# exception pxf

To control the core dumps that are generated when an exception occurs in one of the Parallel eXpress Forwarding (PXF) columns, use the **exception pxf** command in global configuration mode. To disable the creation of core dumps during PXF exceptions, use the **no** form of this command.

```
exception pxf { core-file filename | flash device | style { full | localized | minimal | smart } }
```

```
no exception pxf { core-file | flash | style }
```

## Syntax Description

|                                  |                                                                                                         |
|----------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>core-file</b> <i>filename</i> | Sets the filename for the core-dump file generated during a PXF exception.                              |
| <b>flash</b> <i>device</i>       | Specifies the Flash memory device on which to save the core-dump file generated during a PXF exception. |
| <b>style</b>                     | Specifies the type of core-dump file to be generated during a PXF exception.                            |
| <b>full</b>                      | Creates a full core-dump file of all PXF columns.                                                       |
| <b>localized</b>                 | Creates a core-dump file of the PXF column that failed, along with its neighboring columns.             |
| <b>minimal</b>                   | Creates a minimal core-dump file of the PXF exception.                                                  |
| <b>smart</b>                     | Creates a core-dump file that contains the data related to the PXF exception.                           |

## Defaults

Core dumps are not generated during PXF exceptions.

## Command Modes

Global configuration

## Command History

| Release    | Modification                                               |
|------------|------------------------------------------------------------|
| 12.2(4)XF1 | This command was introduced for the Cisco uBR10012 router. |

## Usage Guidelines



### Caution

Use the **exception pxf** command only under the direction of a technical support representative. Creating a core dump can disrupt network operations. The core dump is a large binary file that can be interpreted only by technical personnel who have access to source code and detailed memory maps.

## Examples

The following example shows how to specify that the Cisco uBR10012 router should create a minimal core-dump file for PXF exceptions, and that this file should be named ubr10k-pxf and be written to the disk1 device:

```
Router# configure terminal
Router(config)# exception pxf style minimal
Router(config)# exception pxf core-file ubr10k-pxf
```

**exception pxf**

```
Router(config)# exception pxf flash disk1:
Router(config)#
```

**Related Commands**

| Command                      | Description                                                                                                                                                |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">show pxf xcm</a> | Displays the current state of error checking and correcting (ECC) for the External Column Memory (XCM) on the Parallel eXpress Forwarding (PXF) processor. |

# facility-alarm (ubr10012)

To set the temperature thresholds at which the Performance Routing Engine (PRE) module generates a critical, major, or minor alarm to warn of potential equipment damage, use the **facility-alarm** command in global configuration mode. To disable the temperature alarms, use the **no** form of this command.

```

facility-alarm { core-temperature | intake-temperature }
 { critical exceed-action shutdown | major [temp] | minor [temp] }

no facility-alarm { core-temperature | intake-temperature }
 { critical exceed-action shutdown | major [temp] | minor [temp] }

```

## Syntax Description

|                                        |                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>core-temperature</b>                | Specifies the temperature threshold for the temperature sensors near the center of the PRE module.                                                                                                                                                                                                                                     |
| <b>intake-temperature</b>              | Specifies the temperature threshold for the temperature sensors at the air intake slots.                                                                                                                                                                                                                                               |
| <b>critical exceed-action shutdown</b> | In Cisco IOS Release 12.2(11)BC1 and later releases, specifies that a critical temperature alarm should shut down the router after two minutes. This was the default behavior in previous releases.                                                                                                                                    |
| <b>major</b> [ <i>temp</i> ]           | Specifies the temperature, in degrees Centigrade, at which the PRE module generates a major alarm to warn of potential damage from excessive temperatures.<br><br>The valid range for <i>temp</i> is 20 to 67 degrees Centigrade, with a default of 58 for the core temperature threshold and 54 for the intake-temperature threshold. |
| <b>minor</b> [ <i>temp</i> ]           | Specifies the temperature, in degrees Centigrade, at which the PRE module generates a minor alarm to warn of potential damage from excessive temperatures.<br><br>The valid range for <i>temp</i> is 20 to 67 degrees Centigrade, with a default of 50 for the core temperature threshold and 45 for the intake-temperature threshold. |

## Command Default

If no specific temperature is given, that particular facility alarm is reset to its default value. The default core temperature thresholds are 85 (critical), 58 (major), and 50 (minor). The default intake-temperature thresholds are 72 (critical), 54 (major), and 45 (minor) degrees Centigrade.

In Cisco IOS releases previous to Cisco IOS Release 12.2(11)BC1, a critical alarm automatically shuts down the router after two minutes to prevent temperature damage. In Cisco IOS Release 12.2(11)BC1 and later, a critical alarm by default does not shut down the router.



### Note

The default temperature thresholds for the critical core and intake temperatures were changed in Cisco IOS Release 12.2(11)BC1.

## Command Modes

Global configuration (config)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                                          |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(1)XF1  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                                                                                                            |
| 12.2(11)BC1 | The <b>critical exceed-action shutdown</b> option was added. In addition, the default value for the core critical temperature threshold was raised from 57 to 67 degrees Centigrade, and the default value for the intake critical temperature threshold was raised from 60 to 85 degrees Centigrade. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                                                                                            |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                                                                                                                                       |

**Usage Guidelines****Note**

The **facility-alarm core-temperature critical** and **facility-alarm intake-temperature critical** commands are available only if the **service internal** command is defined in the configuration.

The PRE module on the Cisco uBR10012 router contains temperature sensors that monitor the temperature at the air intake slots and on the PRE module itself. The **facility-alarm** command configures the router for the temperature thresholds that will generate a minor, major, or critical alarm, so as to notify the system operators of the temperature problem before excessive heat can damage the router or any of its components.

Before Cisco IOS Release 12.2(11)BC1, a critical alarm would also automatically shut down the router after two minutes. Cisco IOS Release 12.2(11)BC1 made this automatic shutdown a configurable option, so that the system operators can decide whether or not a critical alarm should power down the router.

As a general rule, do not disable the automatic shutdown of the router unless you have a systems operator available to immediately respond to any critical temperature alarms, because this could result in system damage. Typically, the primary reason to disable the automatic shutdown would be if you are replacing the fan tray assembly and want to ensure that the router does not power down if the procedure takes longer than expected.

**Note**

A line card also automatically shuts itself down if the temperature exceeds operational levels. In addition, the AC and DC PEMs also automatically power down if they exceed their operational temperature. However, high temperatures could still cause damage to other components if the problem is not quickly resolved.

**Examples**

The following example shows how to configure the Cisco uBR10012 router so that it generates a minor alarm when the intake temperature exceed 55°C:

```
Router# configure terminal
Router(config)# facility-alarm intake-temperature minor 55
```

The following example shows how to configure the Cisco uBR10012 router to automatically shut down if the high temperature continues for more than two minutes:

```
Router# configure terminal
Router(config)# service internal
Router(config)# facility-alarm core-temperature critical exceed-action shutdown
```

The following example shows how to disable the automatic shutdown feature for both the core and intake temperatures. A critical alarm is still generated when the default critical temperatures are exceeded, but the router does not automatically shut itself down:

```
Router# configure terminal
Router(config)# no facility-alarm core-temperature critical exceed-action shutdown
Router(config)# no facility-alarm intake-temperature critical exceed-action shutdown
```

The following commands disable major and minor alarms for both the core and intake temperature thresholds (but critical alarms are still generated):

```
Router# configure terminal
Router(config)# no facility-alarm core-temperature major
Router(config)# no facility-alarm core-temperature minor
Router(config)# no facility-alarm intake-temperature major
Router(config)# no facility-alarm intake-temperature minor
```

#### Related Commands

| Command                           | Description                                                                     |
|-----------------------------------|---------------------------------------------------------------------------------|
| <b>clear facility-alarm</b>       | Clears some or all of the facility alarms on the Cisco uBR10012 router.         |
| <b>show facility-alarm status</b> | Displays the current temperature thresholds that will trigger a facility alarm. |

# hccp authentication

To specify the authentication algorithm on a working or protect cable interface, or both use the **hccp authentication** command in cable interface configuration mode. To disable authentication on a Working CMTS or Protect CMTS, use the **no** form of this command.

**hccp group authentication {md5 | text}**

**no hccp group authentication {md5 | text}**

## Syntax Description

|              |                                                                                                                                                                                                                                             |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group</i> | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive.                                                                                                                                         |
| <b>md5</b>   | Authentication algorithm. In Cisco IOS Release 12.1(3a)EC, MD5 is the only authentication algorithm supported.                                                                                                                              |
| <b>text</b>  | Unencrypted text specification. Rather than automatically encrypting the authentication key-chain when using the MD5 authentication algorithm, Cisco IOS software simply passes the authentication key-chain as standard, unencrypted text. |

## Command Default

The default authentication algorithm is MD5.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release                   | Modification                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
| 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
| 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |
| 12.2(15)BC1               | Support was added for the Cisco uBR-MC5X20U/S BPE on the Cisco uBR10012 router.                                                                           |
| 12.3(17a)BC2              | Support was added for the Cisco uBR-MC5X20H BPE on the Cisco uBR10012 router.                                                                             |
| 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                                                                                                  |

## Usage Guidelines

Use this command together with the **hccp authentication key-chain** command to enable and specify the type of N+1 redundancy authentication you will use in your protection scheme.

**Examples**

The following example shows how to specify MD5 as the authentication algorithm for group 1:

```
Router(config-if)# hccp 1 authentication md5
```

**Related Commands**

| Command                              | Description                                                                                                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp authentication key-chain</b> | Enables authentication on a given interface and specifies one or more keys that can be used to perform authentication for a specified group. |
| <b>show hccp</b>                     | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.                |
| <b>show hccp interface</b>           | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured.         |

# hccp authentication key-chain

To enable authentication and define one or more authentication keys to use in a specified group, use the **hccp authentication key-chain** command in cable interface configuration mode. To disable authentication, use the **no** form of this command. The key chains you define must match one or more key chains configured in the Working CMTS or Protect CMTS configuration file.

**hccp group authentication key-chain** *key-chain*

**no hccp group authentication key-chain** [*key-chain*]

|                           |                  |                                                                                                                                                                          |
|---------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>group</i>     | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive.                                                                      |
|                           | <i>key-chain</i> | A text string matching a key chain in the Working CMTS or Protect CMTS configuration file. A key chain must have at least one key and can have up to 2,147,483,647 keys. |

**Command Default** No default behavior or values

**Command Modes** Interface configuration (cable interface only)

| <b>Command History</b> | <b>Release</b>            | <b>Modification</b>                                                                                                                                       |
|------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
|                        | 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
|                        | 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
|                        | 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
|                        | 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |
|                        | 12.2(15)BC1               | Support was added for the Cisco uBR-MC5X20U/S BPE on the Cisco uBR10012 router.                                                                           |
|                        | 12.3(17a)BC2              | Support was added for the Cisco uBR-MC5X20H BPE on the Cisco uBR10012 router.                                                                             |
|                        | 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                                                                                                  |

**Usage Guidelines** Use this command in conjunction with the **hccp authentication** command to enable and specify the type of 1+1 redundancy authentication you will use in your protection scheme.




**Note**

You cannot perform authentication on a specified group until you have first defined at least one authentication key chain in global configuration mode.

**Examples**

The following excerpt from a configuration file enables authentication using the MD5 algorithm and defines the authentication key “cisco1” for group 1:

```
!
key chain cisco1
 key 1
 key-string abcdefg
 key 2
 key-string 123456789
!
...
!
interface cable 3/0
 hccp 1 authentication md5
 hccp 1 authentication key-chain cisco1
!
```

**Related Commands**

| Command                              | Description                                                                                                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp authentication</b>           | Specifies the authentication algorithm for the Working CMTS or Protect CMTS.                                                                 |
| <b>hccp authentication key-chain</b> | Enables authentication on a given interface and specifies one or more keys that can be used to perform authentication for a specified group. |
| <b>key-chain</b>                     | Defines one or more key chains for authentication between the Working CMTS or Protect CMTS.                                                  |
| <b>show hccp</b>                     | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.                |
| <b>show hccp interface</b>           | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured.         |

# hccp bypass version

To enter bypass version mode for a specific Hot Standby Connection-to-Connection Protocol (HCCP) group, in which the hardware and software version checks are not performed before switching over to a protect interface, use the **hccp bypass version** command in privileged EXEC mode.

**hccp group bypass version**

| Syntax Description |                                                                            |
|--------------------|----------------------------------------------------------------------------|
| <i>group</i>       | The group number for the specified interface. The valid range is 1 to 255. |

| Command Default |                                                                                                                                                                             |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | Normal HCCP operations ( <b>hccp group check version</b> ), where hardware and software version checks are made between the Working and Protect cable interface line cards. |

| Command Modes |                 |
|---------------|-----------------|
|               | Privileged EXEC |

| Command History | Release                   | Modification                                                                                                                                                |
|-----------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(4)XF1,<br>12.2(4)BC1 | This command was introduced for the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card with the Cisco RF Switch.                                            |
|                 | 12.2(8)BC2                | Support was added for the Cisco uBR10012 router using the Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards with the Cisco RF Switch. |
|                 | 12.2(11)BC1               | Support was added for the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards with the Cisco RF Switch.                 |
|                 | 12.2(15)BC1               | Support was added for the Cisco uBR-MC5X20U/S BPE on the Cisco uBR10012 router.                                                                             |
|                 | 12.3(17a)BC2              | Support was added for the Cisco uBR-MC5X20H BPE on the Cisco uBR10012 router.                                                                               |
|                 | 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                                                                                                    |

| Usage Guidelines |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | By default, the Cisco CMTS verifies that the Working and Protect cable interfaces are using the same versions of software and hardware, so as to avoid potential incompatibilities during a switchover. The hardware check verifies that the Working and Protect cable interface line cards are compatible. The software check verifies that the two cards are running the same major versions of software. If either of these two conditions is not true, the CMTS by default does not perform the switchover. |

You can override these version checks for a particular HCCP group by using the **hccp bypass version** command. After you give this command, the Cisco CMTS does not check the hardware or software versions of the two cable interfaces before performing a switchover. To return to normal HCCP operations, so that version checks are made for a group, use the **hccp check version** command.

**Note**

Two cable interface line cards are compatible when the Protect card has at least the same number of upstreams or downstreams as the Working card. The exceptions to this are that the Cisco uBR-MC16E card can be protected only by another Cisco uBR-MC16E card. Also, the DOCSIS versions of the Cisco uBR-MC16 card can be protected only by another Cisco uBR-MC16C card. You cannot use the Cisco uBR-MC28C card to protect a Cisco uBR-MC16B/C/S card.

**Examples**

The following example shows how to disable the hardware and software version checks for HCCP group number 20. After giving this command, the Cisco CMTS will switchover from the Working to Protect interface in group 20 without first verifying the cards' compatibility:

```
Router# hccp 20 bypass version
Router#
```

**Related Commands**

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp check version</b>  | Exits bypass version mode, and returns to normal HCCP operation.                                                                     |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# hccp channel-switch

To configure the Cisco CMTS so that a Cisco RF Switch or Vecima (Wavecom) upconverter becomes a Hot Standby Connection-to-Connection Protocol (HCCP) member in a particular HCCP group, use the **hccp channel-switch** command in cable interface configuration mode. To remove the configuration for the Cisco RF Switch or upconverter, use the **no** form of this command.

**hccp group channel-switch** *member-id* *switch-name* **rfswitch-group** *rfswitch-ip-address*  
*module-bitmap* *position*

**hccp group channel-switch** *member-id* *switch-name* **rfswitch-module** *rfswitch-ip-address*  
*module-number* *position*

**hccp group channel-switch** *member-id* *switch-name* **tty-switch** [**aux** | **console** | **vty**] *line-number*  
*port*

**hccp group channel-switch** *member-id* *switch-name* {**wavecom-hd** | **wavecom-ma**}  
*prot-ip-address* *protect-module* *work-ip-address* *work-module*

**no hccp group channel-switch** *member-id* *switch-name*

## Syntax Description

|                            |                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group</i>               | The group number for the specified interface. The valid range is 1 to 255.                                                                                                                                                                                                                                                                                                |
| <i>member-id</i>           | The member number within the specified group. The valid range is 1 to 255.                                                                                                                                                                                                                                                                                                |
| <i>switch-name</i>         | (Optional) Alpha-numeric string specifies the name of the Cisco RF Switch.                                                                                                                                                                                                                                                                                                |
| <b>rfswitch-group</b>      | Specifies that this is the configuration for a Cisco RF Switch group.                                                                                                                                                                                                                                                                                                     |
| <b>rfswitch-module</b>     | Specifies that this is the configuration for a Cisco RF Switch module.                                                                                                                                                                                                                                                                                                    |
| <i>rfswitch-ip-address</i> | Specifies the IP address of the Cisco RF Switch to which the CMTS is connected.                                                                                                                                                                                                                                                                                           |
| <i>module-bitmap</i>       | Specifies the module-bitmap in hexadecimal. The valid range is 0 to FFFFFFFF.<br><br><b>Tip</b> See the TAC-authored <i>N+1 Tips and Configuration</i> document on Cisco.com for more information on the format of the bitmap, and for a worksheet that can be used to calculate the bitmap.                                                                              |
| <i>module-number</i>       | Specifies the module number on the Cisco RF Switch. The valid range is 1 to 255.<br><br><b>Note</b> This setting must be configured on the Cisco RF Switch as well as the Cisco CMTS.                                                                                                                                                                                     |
| <i>position</i>            | Specifies the position for the Working channel on the Cisco RF Switch. The valid range is 1 to 8.                                                                                                                                                                                                                                                                         |
| <b>tty-switch</b>          | Specifies the configuration of a Cisco RF Switch that is controlled by its TTY line. You can further specify the type of port being used to control the switch. By default, one of the Cisco RF Switch's serial ports is used, or you can use the <b>aux</b> , <b>console</b> , or <b>vty</b> lines.<br><br><b>Note</b> Ensure that the switch's DIP switch is set to 00. |
| <b>aux</b>                 | (Optional) Specifies that the auxiliary port is being used to control the Cisco RF Switch.                                                                                                                                                                                                                                                                                |

|                        |                                                                                                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>console</b>         | (Optional) Specifies that the console port is being used to control the Cisco RF Switch.                                                                                                                                                 |
| <b>vty</b>             | (Optional) Specifies that a Virtual Terminal connection (Telnet connection) is being used to control the Cisco RF Switch.                                                                                                                |
| <i>line-number</i>     | Specifies the line number on which the Cisco RF Switch is receiving control information for this CMTS. The valid range is 0 to 17 for the default serial port, 0 for the aux port, 0 for the console port, and 0 to 99 for the vty port. |
| <i>port</i>            | Specifies the port number being used on the Cisco RF Switch. The valid range is 1 to 255.                                                                                                                                                |
| <b>wavecom-hd</b>      | Specifies that this is the configuration for a Vecima (Wavecom) HD4040 and QHD4040 upconverter.                                                                                                                                          |
| <b>wavecom-ma</b>      | Specifies that this is the configuration for a Vecima (Wavecom) DUAL4040D, MA4040D, or UC4040D upconverter.                                                                                                                              |
| <i>prot-ip-address</i> | Specifies the IP address for the upconverter used for the Protect interface used for this cable interface.                                                                                                                               |
| <i>protect-module</i>  | Specifies the module number on the upconverter used for the Protect interface to be used for this cable interface. The valid range is 1 to 255.                                                                                          |
| <i>work-ip-address</i> | Specifies the IP address for the upconverter used for the Working interface used for this cable interface.                                                                                                                               |
| <i>work-module</i>     | Specifies the module number on the upconverter used for the Working interface to be used for this cable interface. The valid range is 1 to 255.                                                                                          |

**Command Default**

The CMTS is not configured to use a Cisco RF Switch by default, and no cable interfaces are configured for N+1 redundancy by default.

**Command Modes**

Interface configuration—cable interface only (config-if)

**Command History**

| Release                   | Modification                                                                                                                             |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(4)XF1,<br>12.2(4)BC1 | This command was introduced for the Cisco uBR10012 router, replacing the <b>hccp ds-switch</b> command for use with the Cisco RF Switch. |
| 12.2(8)BC2                | Support was added for the Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards on the Cisco uBR10012 router.          |
| 12.2(11)BC1               | Support was added for the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.                       |
| 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                                                                                 |

**Usage Guidelines**

You must configure each Working and Protect cable interface for use with the Cisco RF Switch, typically specifying one **hccp channel-switch** command to configure the Cisco RF Switch information, and another **hccp channel-switch** command to configure the upconverter.

The Protect interface is configured with the same **hccp channel-switch** commands as those that are used on the Working interface. However, typically, the same Protect interface is configured with multiple **hccp channel-switch** commands to protect multiple Working interfaces.

### Examples

The following example shows the cable interface 8/1/0 being configured as member 1 for the Working interface of HCCP group 1. This interface is configured to use the Wavecom HD4040 upconverter with the IP address of 10.97.1.21. The upconverter's module number 2 (B) is used for the Protect interface, and module number 16 (P) is used for the Working interface. The interface uses the Cisco RF Switch at IP address 10.97.1.20, using a module bitmap of AA200000 in switch slot 1.

```
Router# configure terminal
Router(config)# interface cable8/1/0
Router(config-if)# hccp 1 working 1
Router(config-if)# hccp 1 channel-switch 1 uc wavecom-hd 10.97.1.21 2 10.97.1.21 16
Router(config-if)# hccp 1 channel-switch 1 rfswitch rfswitch-group 10.97.1.20 AA200000 1
```

The following example shows the corresponding configuration for the Protect interface for member 1 of HCCP group 1, which is cable interface 5/1/0 on the same chassis. The **hccp channel-switch** commands are identical to those used for cable interface 8/1/0.

```
Router# configure terminal
Router(config)# interface cable5/1/0
Router(config-if)# hccp 1 protect 1 10.97.1.8
Router(config-if)# hccp 1 channel-switch 1 uc wavecom-hd 10.97.1.21 2 10.97.1.21 16
Router(config-if)# hccp 1 channel-switch 1 rfswitch rfswitch-group 10.97.1.20 AA200000 1
```

Typically, the same Protect interface is used to protect multiple Working cable interfaces. For example, this same interface could be configured as follows to protect a Working interface that is using module number 14 (N) on the same Wavecom HD4040 upconverter, using slot 2 in the RF Switch.

```
Router# configure terminal
Router(config)# interface cable5/1/0
Router(config-if)# hccp 1 protect 2 10.97.1.8
Router(config-if)# hccp 1 channel-switch 2 uc wavecom-hd 10.97.1.21 2 10.97.1.21 14
Router(config-if)# hccp 1 channel-switch 2 rfswitch rfswitch-group 10.97.1.20 AA200000 2
```

### Related Commands

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp check version</b>  | Exits bypass version mode, and returns to normal HCCP operation.                                                                     |
| <b>hccp ds-switch</b>      | Specifies the downstream upconverter module for a Working CMTS or Protect CMTS (deprecated command).                                 |
| <b>hccp protect</b>        | Allows you to configure a Cisco CMTS to be a Protect CMTS for a specified Working CMTS in a 1+1 redundancy environment.              |
| <b>hccp working</b>        | Allows you to designate a Cisco CMTS to be a Working CMTS in a 1+1 redundancy environment.                                           |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# hccp check version

To exit bypass version mode and return to normal Hot Standby Connection-to-Connection Protocol (HCCP) operations for a specific HCCP group, use the **hccp check version** command in privileged EXEC mode.

## **hccp group check version**

|                           |              |                                                                            |
|---------------------------|--------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>group</i> | The group number for the specified interface. The valid range is 1 to 255. |
|---------------------------|--------------|----------------------------------------------------------------------------|

|                        |                                                                                                                                                                             |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | Normal HCCP operations ( <b>hccp group check version</b> ), where hardware and software version checks are made between the Working and Protect cable interface line cards. |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| <b>Command History</b> | <b>Release</b>            | <b>Modification</b>                                                                                                                                         |
|------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.2(4)XF1,<br>12.2(4)BC1 | This command was introduced for the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card with the Cisco RF Switch.                                            |
|                        | 12.2(8)BC2                | Support was added for the Cisco uBR10012 router using the Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards with the Cisco RF Switch. |
|                        | 12.2(11)BC1               | Support was added for the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards with the Cisco RF Switch.                 |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | By default, the Cisco CMTS verifies that the Working and Protect cable interfaces are using the same versions of software and hardware, so as to avoid potential incompatibilities during a switchover. The hardware check verifies that the Working and Protect cable interface line cards are compatible. The software check verifies that the two cards are running the same major versions of software. If either of these two conditions is not true, the CMTS by default does not perform the switchover. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

You can override these version checks for a particular HCCP group by using the **hccp bypass version** command. After you give this command, the Cisco CMTS does not check the hardware or software versions of the two cable interfaces before performing a switchover. To return to normal HCCP operations, so that version checks are made for a group, use the **hccp check version** command.

**Note**

Two cable interface line cards are compatible when the Protect card has at least the same number of upstreams or downstreams as the Working card. The exceptions to this are that the Cisco uBR-MC16E card can be protected only by another Cisco uBR-MC16E card. Also, the DOCSIS versions of the Cisco uBR-MC16 card can be protected only by another Cisco uBR-MC16C card. You cannot use the Cisco uBR-MC28C card to protect a Cisco uBR-MC16B/C/S card.

---

**Examples**

The following example shows how to cancel a previous **hccp bypass version** command for HCCP group 1 and to return to normal HCCP operations:

```
Router# hccp 1 check version
Router#
```

---

**Related Commands**

| Command                    | Description                                                                                                                                                             |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp bypass version</b> | Enters bypass version mode for a specific HCCP group, in which the hardware and software version checks are not performed before switching over to a protect interface. |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.                                           |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured.                                    |



# hccp ds-switch

To specify the downstream upconverter module for a Working CMTS or Protect CMTS, use the **hccp ds-switch** command in cable interface configuration mode. To negate a downstream upconverter assignment, use the **no** form of this command.

**hccp group ds-switch member make host-ipaddr host-module peer-ipaddr peer-module**

**no hccp group ds-switch member**



## Note

This command has been deprecated in current Cisco IOS releases and has been replaced by the **hccp channel-switch** command.

## Syntax Description

|                    |                                                                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group</i>       | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive.                                                     |
| <i>member</i>      | The member number within the specified group.                                                                                                           |
| <i>make</i>        | The maker of the specified upconverter. Currently, only the Wavecom upconverter is supported ( <b>wavecom</b> ).                                        |
| <i>host-ipaddr</i> | The IP address of the upconverter module <sup>1</sup> to which the host CMTS is connected.                                                              |
| <i>host-module</i> | The upconverter module number to which the host CMTS is connected. This location is expressed as a simple numeric designation.                          |
| <i>peer-ipaddr</i> | The IP address of the upconverter module to which the peer (or remote) CMTS is connected.                                                               |
| <i>peer-module</i> | The upconverter module number <sup>1</sup> to which the peer (or remote) CMTS is connected. This location is expressed as a simple numeric designation. |

1. The identification of the upconverter module is important to define when the host or peer CMTS is connected to a channel switch housing multiple modules. For example, the Wavecom MA4040D upconverter chassis offers a maximum of 10 independent frequency agile upconverters.

## Command Default

Upconverter specification and activation is disabled by default and must be specified before switching can take place.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release                   | Modification                                                                        |
|---------------------------|-------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                   |
| 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                |
| 12.2(4)XF1,<br>12.2(4)BC1 | This command was deprecated and replaced by the <b>hccp channel-switch</b> command. |

**Usage Guidelines**

It is necessary to configure the downstream upconverter module for all Protect CMTS and Working CMTS systems. If you do not specify the downstream upconverter module for all Protect CMTS and Working CMTS systems, you cannot switch between a Protect CMTS and Working CMTS.

**Examples**

The following excerpt from a configuration file specifies module 2 on a Wavecom upconverter at IP address 1.1.11.3 as the host switch module connected to Working CMTS 1 and module 1 on the same Wavecom upconverter (with the same IP address location) as the peer or remote switch module connected to the Protect CMTS:

```
hccp 1 working 1
hccp ds-switch 1 wavecom 1.1.11.3 2 1.1.11.3 1
```

**Related Commands**

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp channel-switch</b> | (replaces the <b>hccp ds-switch</b> command).                                                                                        |
| <b>hccp protect</b>        | Allows you to configure a Cisco CMTS to be a Protect CMTS for a specified Working CMTS in a 1+1 redundancy environment.              |
| <b>hccp working</b>        | Allows you to designate a Cisco CMTS to be a Working CMTS in a 1+1 redundancy environment.                                           |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# hccp lockdown

To prevent a Working CMTS from automatically switching to a Protect CMTS in the same group, use the **hccp lockdown** command in privileged EXEC mode.

**Note**

This command is applicable only to Working CMTS in a given group. Issuing this command on a Protect CMTS has no effect.

**hccp group lockdown member**

**Syntax Description**

|               |                                                                                                     |
|---------------|-----------------------------------------------------------------------------------------------------|
| <i>group</i>  | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive. |
| <i>member</i> | The member number within the specified group.                                                       |

**Command Default**

By default, the **hccp lockdown** command is inactive.

**Command Modes**

Privileged EXEC

**Command History**

| Release                   | Modification                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
| 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
| 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |

**Usage Guidelines**

Typically the **hccp lockdown** command is used to disable HCCP switchovers before removing the HCCP configuration on the Working interface. Otherwise, when you remove the HCCP configuration from the Working interface, the Protect interface assumes the Working interface has failed and switches over.

You might also want to prevent a Working CMTS from automatically switching back to a Protect CMTS for testing or additional configuration purposes. For example, you might want to fully test protecting cable interfaces on your Cisco CMTS before returning it to protect status.

**Examples**

The following example shows how to activate the lockdown feature of a Working CMTS in group 1:

```
Router# hccp 1 lockdown
```

| Related Commands | Command                    | Description                                                                                                                                             |
|------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>hccp unlockout</b>      | Negates the effects of the <b>hccp lockdown</b> EXEC command, making the CMTS available for automatic switchover from a Working CMTS to a Protect CMTS. |
|                  | <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.                           |
|                  | <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured.                    |

# hccp protect

To configure a particular cable interface to protect another cable interface in the same group, use the **hccp protect** command in cable interface configuration mode. To undo a particular host cable interface protection assignment, use the **no** form of this command.

**hccp group protect member ipaddr**

**no hccp group protect member**

## Syntax Description

|               |                                                                                                                                                                         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group</i>  | The group number of both the Working and Protect cable interfaces. Valid values are any number from 1 to 255, inclusive.                                                |
| <i>member</i> | The member number of the specified Working cable interface. Valid values are any number from 1 to 255, inclusive.                                                       |
| <i>ipaddr</i> | An IP address for any working interface (other than protected cable interfaces) installed in the Working CMTS that can transmit and receive redundancy status messages. |

## Command Default

No default behavior or values

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release                   | Modification                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
| 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
| 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |

## Usage Guidelines

The protect cable interface must be configured identically to the working cable interface, which typically means the interfaces must be the same card type. However, when the Cisco uBR-MC16S card is used, it can be used with either another Cisco uBR-MC16S card or a Cisco uBR-MC16C card.

[Table 30](#) shows how a switchover affects the enhanced spectrum management features of the Cisco uBR-MC16S card.

**Table 30** *Switchover Operation for a Cisco uBR-MC16C/Cisco uBR-MC16S Configuration*

| Working Cable Interface | Protect Cable Interface | Operation After Switchover                                                                                                                                                                                                                                        |
|-------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco uBR-MC16C         | Cisco uBR-MC16S         | The protect card (Cisco uBR-MC16S) uses the same upstream frequency as the working card, but after the system stabilizes, the protect card begins using the enhanced spectrum management features of the Cisco uBR-MC16S card, as configured on the protect CMTS. |
| Cisco uBR-MC16S         | Cisco uBR-MC16C         | The protect card (Cisco uBR-MC16C) uses the same upstream frequency as the working card. If the upstream becomes unstable, the Cisco uBR-MC16C performs only blind frequency hopping.                                                                             |
| Cisco uBR-MC16S         | Cisco uBR-MC16S         | The protect card initially uses the same upstream frequency as the working card, but after the system stabilizes, the protect card continues using the enhanced spectrum management features of the Cisco uBR-MC16S card.                                         |

**Examples**

The following example configures host cable interface 4/0 to protect member 2 of group 2 at IP address 1.1.11.2:

```
Router(config)# interface cable 4/0
Router(config-if)# hccp 2 protect 2 1.1.11.2
```

**Related Commands**

| Command                          | Description                                                                                                                                                                               |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable downstream rf-power</b> | Sets the RF power output level on a cable interface line card with an integrated upconverter (including the ability to specify an override or delta power value for a Protect interface). |
| <b>hccp working</b>              | Configures a specified cable interface to be a working member of a given group.                                                                                                           |
| <b>show hccp</b>                 | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.                                                             |
| <b>show hccp interface</b>       | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured.                                                      |

# hccp resync

To manually synchronize the Inter-database between the Working and Protect interfaces for a particular member in an Hot Standby Connection-to-Connection Protocol (HCCP) group, use the **hccp resync** command in privileged EXEC mode.

**hccp group resync member**

|                           |               |                                                                            |
|---------------------------|---------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>group</i>  | The group number for the specified interface. The valid range is 1 to 255. |
|                           | <i>member</i> | The member ID to be resynchronized. The valid range is 1 to 255.           |

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| <b>Command History</b> | <b>Release</b>            | <b>Modification</b>                                                                                                                                         |
|------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.2(4)XF1,<br>12.2(4)BC1 | This command was introduced for the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card with the Cisco RF Switch.                                            |
|                        | 12.2(8)BC2                | Support was added for the Cisco uBR10012 router using the Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards with the Cisco RF Switch. |
|                        | 12.2(11)BC1               | Support was added for the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards with the Cisco RF Switch.                 |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The Cisco CMTS automatically synchronizes the Working and Protect interfaces to ensure that when a switchover occurs, the Protect interface will run with a configuration that is identical to that of the Working interface. However, if you are troubleshooting HCCP problems, you can manually resynchronize the databases using the <b>hccp resync</b> command before performing any switchover tests. |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Note**

When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter a **show** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

|                 |                                                                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to manually resynchronize the Inter-database between the Working and Protect interfaces for member 4 in HCCP group 13: |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# hccp 13 resync 4
```

Router#

| Related Commands | Command                    | Description                                                                                                                          |
|------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
|                  | <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |



# hccp revertive

To configure a cable interface on a Protect CMTS that has assumed working capacity to automatically revert back to the Working CMTS, use the **hccp revertive** command in cable interface configuration mode. To disable the ability for the specified cable interface to automatically revert back to protect status, use the **no** form of this command.

**hccp group revertive**

**no hccp group revertive**

|                           |              |                                                                                                     |
|---------------------------|--------------|-----------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>group</i> | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive. |
|---------------------------|--------------|-----------------------------------------------------------------------------------------------------|

|                        |         |
|------------------------|---------|
| <b>Command Default</b> | Enabled |
|------------------------|---------|

|                      |                                                |
|----------------------|------------------------------------------------|
| <b>Command Modes</b> | Interface configuration (cable interface only) |
|----------------------|------------------------------------------------|

| Command History | Release                   | Modification                                                                                                                                              |
|-----------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
|                 | 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
|                 | 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
|                 | 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
|                 | 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |
|                 | 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                                                                                                  |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Using this command in conjunction with the <b>hccp reverttime</b> command gives you the ability to set up your protecting cable interfaces to automatically switch between working and protecting capacity without your intervention. Otherwise, whenever a switchover has occurred, you must manually reactivate the failed Working CMTS and manually return the Protect CMTS to protect status using the <b>hccp switch</b> command. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## Tip

If you are using the **hccp revertive** command on a cable interface, do not also configure the **hccp track** command. Configuring both commands on the same interface can cause multiple switchovers on the same fault.

### Using hccp track with hccp revertive

As a general rule, if you are using the **hccp track** command on a cable interface, do not also configure the **hccp revertive** command without also configuring **no keepalive** on the cable interface. Configuring both commands on the same interface, along with keepalives, can cause multiple switchovers on the same fault.

If you want to use keepalives along with both the **hccp track** and **hccp revertive** commands, use the **hccp track** command on both the Working and Protect interfaces, so that the Working interfaces on the same card track each other and the Protect interfaces on the same card track each other. [Table 31](#) summarizes the guidelines for using these three commands:

**Table 31** Possible hccp track and hccp revertive Configurations

| hccp track<br>(Working I/Fs) | hccp track<br>(Protect I/Fs) | hccp revertive | keepalive Configuration   |
|------------------------------|------------------------------|----------------|---------------------------|
| Yes                          | No                           | No             | keepalive or no keepalive |
| Yes                          | No                           | Yes            | no keepalive              |
| Yes                          | Yes                          | Yes            | keepalive or no keepalive |

### Examples

The following example shows cable interface 4/0 on a Protect CMTS in group 2 being configured to automatically revert to protect status after the Working CMTS peer has returned to active duty:

```
router(config)# interface cable 4/0
router(config-if)# hccp 2 revertive
```

### Related Commands

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp reverttime</b>     | Specifies the time that the Working CMTS waits before automatically switching back to a Working CMTS following system switchover.    |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# hccp reverttime

To specify the amount of time a Protect interface waits before automatically reverting back to a Working interface following a system switchover, use the **hccp reverttime** command in cable interface configuration mode on the Working CMTS. To set the revert-time back to its default value, use the **no** form of this command.

**hccp group reverttime** *revert-time*

**no hccp group reverttime**

|                           |                    |                                                                                                                                                                                                                                    |
|---------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>group</i>       | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive.                                                                                                                                |
|                           | <i>revert-time</i> | The amount of time (in minutes) that a Protect interface waits before automatically switching back to a Working interface following a system switchover. The allowable range is 1 to 65,535 minutes, with a default of 30 minutes. |

|                 |            |
|-----------------|------------|
| <b>Defaults</b> | 30 minutes |
|-----------------|------------|

|                      |                                                                     |
|----------------------|---------------------------------------------------------------------|
| <b>Command Modes</b> | Interface configuration (cable interface only, on the Working CMTS) |
|----------------------|---------------------------------------------------------------------|

| <b>Command History</b> | <b>Release</b>            | <b>Modification</b>                                                                                                                                       |
|------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
|                        | 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
|                        | 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
|                        | 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
|                        | 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |

|                         |                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Use this command to configure the revert-time on the cable interfaces on the Working CMTS so that the Working CMTS will automatically resume normal operations and the Protect CMTS will automatically resume normal protect operations, in case an operator forgets to manually switch the Working CMTS back into operation after fixing the original problem. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The Working CMTS first counts down two minutes of suspend time before starting to count down the revert-time. Any failures that occur within this two-minute suspend time are considered part of the same failure.

This means that the actual time that the Working CMTS will attempt to switch back after a switchover is two minutes plus the revert-time. For example, if the revert-time is set to its default of 30 minutes, the Working CMTS will attempt to switch back into operation 32 minutes after the initial switchover to the Protect CMTS.

After the suspend time has occurred, a failure in the Protect CMTS will cause a switchover to the Working CMTS, regardless of whether the revert-time has expired or not. You can force such a failure in the Protect CMTS, and restore the Working CMTS to operation without waiting for the revert-time, by using the **cable power off** and **cable power on** commands to turn off and turn on the protect interface on the Protect CMTS.

When choosing a revert-time, take into account all possible sources of failures, including third-party equipment. For example, an upconverter failure can trigger a switchover to the Protect CMTS. You should configure the revert-time so that the Working CMTS does not switch back into operation until technicians have had sufficient time to fix the equipment failure.



Tip

To disable the revert-time feature, use the **no** version of the **hccp revertive** command on the Protect CMTS.

Examples

The following example shows cable interface 3/0 on a Working CMTS in group 2 being configured to wait 15 minutes before automatically reverting back to working status after a system switchover:

```
router(config)# interface cable 3/0
router(config-if)# hccp 2 reverttime 15
```

The following example shows how to give the **no** form of this command, which resets the interface back to its default value of 30 minutes.

```
router(config)# interface cable 5/1/0
router(config-if)# no hccp 2 reverttime
```

Related Commands

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp revertive</b>      | Configures a cable interface on a Protect CMTS to automatically revert back to a Working CMTS.                                       |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# hccp switch

To manually switch a Protect CMTS with its Working CMTS peer (or vice versa), use the **hccp switch** command in privileged EXEC mode.

**hccp** *group switch member*

|                           |               |                                                                                                      |
|---------------------------|---------------|------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>group</i>  | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive.  |
|                           | <i>member</i> | The member number for the specified interface. Valid values are any number from 1 to 255, inclusive. |

|                        |                               |
|------------------------|-------------------------------|
| <b>Command Default</b> | No default behavior or values |
|------------------------|-------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

|                        |                           |                                                                                                                                                                                 |
|------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b>            | <b>Modification</b>                                                                                                                                                             |
|                        | 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                                               |
|                        | 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                                            |
|                        | 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                                      |
|                        | 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards.                       |
|                        | 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.                                 |
|                        | 12.2(11)BC3               | This command is automatically disabled for approximately 2 to 3 seconds after a PRE module switches over to allow the system to stabilize before performing another switchover. |

|                         |                                                                                                                                                                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command overrides any configuration you may have made on your Protect CMTS and Working CMTS using the <b>hccp revert</b> and <b>hccp reverttime</b> commands. In addition, you can issue the <b>hccp switch</b> command on either a Protect CMTS or a Working CMTS to force it to change places with its peer. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows the host Protect CMTS being configured to assume traffic responsibility for member 2 Working CMTS in group 2: |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# hccp 2 switch 2R
```

| Related Commands | Command                    | Description                                                                                                                                        |
|------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>hccp lockdown</b>       | Prevents a Working CMTS from automatically switching to a Protect CMTS in the same group.                                                          |
|                  | <b>hccp unlockout</b>      | Negates the effects of the <b>hccp lockdown</b> command, making the CMTS available for automatic switchover from a Working CMTS to a Protect CMTS. |
|                  | <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.                      |
|                  | <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured.               |

# hccp timers

To configure HELLO packet interval and hold time for a specified group on a Protect CMTS, use the **hccp timers** command in cable interface configuration mode. To erase the HELLO interval and hold time configuration and to assume the default values for each parameter, use the **no** form of this command.

**hccp group timers** *hello-time hold-time*

**no hccp group timers** [*hello-time hold-time*]



## Note

Issuing the **no** form of this command erases any manual HELLO interval and hold time values and automatically resets them to their default values.

## Syntax Description

|                   |                                                                                                                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group</i>      | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive.                                                                                                                                             |
| <i>hello-time</i> | The HELLO packet interval (in milliseconds) between subsequent HELLO packet transmissions. The acceptable range is 1666 to 5,000 milliseconds, inclusive.                                                                                       |
| <i>hold-time</i>  | The time (in milliseconds) that a Protect CMTS will wait before assuming control of voice traffic for a Working CMTS that has failed to acknowledge a series of HELLO packets. The acceptable range is 5,000 to 25,000 milliseconds, inclusive. |

## Command Default

The default HELLO interval is 2,000 milliseconds, and the default hold time is 6,000 milliseconds.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release                   | Modification                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
| 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
| 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |

---

**Examples**

The following example shows the HELLO interval and hold time on a Protect CMTS in group 2 being configured to 1,750 and 3,000 milliseconds, respectively:

```
Router(config)# interval c4/0
Router(config-if)# hccp 2 timers 1750 3000
```

---

**Related Commands**

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp protect</b>        | Configures a particular cable interface to protect another peer cable interface in the same group.                                   |
| <b>hccp working</b>        | Configures a specified cable interface to be a working member of a given group.                                                      |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |



# hccp track

To configure a cable interface on a Working CMTS or Protect CMTS to enable automatic switchover based on the interface state, use the **hccp track** command in cable interface configuration mode. To disable the automatic switchover based on interface state, use the **no** form of this command.

**hccp group track** [*interface*]

**no hccp group track** [*interface*]

## Syntax Description

|                  |                                                                                                     |
|------------------|-----------------------------------------------------------------------------------------------------|
| <i>group</i>     | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive. |
| <i>interface</i> | Specifies another cable interface (the default is the current cable interface).                     |

## Command Default

Enabled for the current interface

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release                   | Modification                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
| 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
| 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |

## Usage Guidelines

This command enables automatic switchover of one interface when a tracked interface switches over from “up” to “down.”

Typically, this command is used to allow all interfaces on one card to track one another, so that if one interface goes down and switches over to the Protect, all other interfaces can also switch over, allowing the Protect card to assume full operation for these interfaces. This allows support engineers to troubleshoot the problem on the Working interface, or to remove and replace the Working card, if necessary, without interfering with traffic.

### Using hccp track with hccp revertive

As a general rule, if you are using the **hccp track** command on a cable interface, do not also configure the **hccp revertive** command without also configuring **no keepalive** on the cable interface. Configuring both commands on the same interface, along with keepalives, can cause multiple switchovers on the same fault.

If you want to use keepalives along with both the **hccp track** and **hccp revertive** commands, use the **hccp track** command on both the Working and Protect interfaces, so that the Working interfaces on the same card track each other and the Protect interfaces on the same card track each other. [Table 32](#) summarizes the guidelines for using these three commands:

**Table 32** Possible hccp track and hccp revertive Configurations

| hccp track<br>(Working I/Fs) | hccp track<br>(Protect I/Fs) | hccp revertive | keepalive Configuration   |
|------------------------------|------------------------------|----------------|---------------------------|
| Yes                          | No                           | No             | keepalive or no keepalive |
| Yes                          | No                           | Yes            | no keepalive              |
| Yes                          | Yes                          | Yes            | keepalive or no keepalive |

### Examples

The following example shows switchover behavior being enabled on a Cisco CMTS in group 2:

```
Router(config)# interface c3/0
Router(config-if)# hccp 2 track
Router(config-if)# keepalive
Router(config-if)#
```

The following example shows two Cisco uBR-LCP2-MC28C cards being used in a Cisco uBR10012 router, with each downstream being configured for a separate HCCP group. The card in slot 5/1 is being configured as the Working interfaces and the card in slot 6/1 is being configured as the Protect interfaces.

The two downstreams on each card track each other, so if one downstream fails and switches over, the other can do so as well, allowing the Protect card to assume full control of both interfaces. Similarly, when the Working interfaces come back into service, both Protect interfaces switch back at the same time.

```
Router(config)# interface cable c5/1/0
Router(config-if)# hccp 1 working 1
Router(config-if)# hccp 1 track c5/1/1
Router(config-if)# keepalive 3
Router(config-if)# exit
Router(config)# interface cable c5/1/1
Router(config-if)# hccp 2 working 1
Router(config-if)# hccp 2 track c5/1/0
Router(config-if)# keepalive 3
Router(config-if)# exit
Router(config)# interface cable c6/1/0
Router(config-if)# hccp 1 protect 1 ip-address-of-mgmt-lan
Router(config-if)# hccp 1 track c6/1/1
Router(config-if)# keepalive 3
Router(config-if)# exit
Router(config)# interface cable c6/1/1
Router(config-if)# hccp 2 protect 1 ip-address-of-mgmt-lan
Router(config-if)# hccp 2 track c6/1/0
Router(config-if)# keepalive 3
Router(config-if)#
```

| Related Commands | Command                    | Description                                                                                                                                                                                                                                |
|------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>keepalive</b>           | A global configuration command that allows you to specify the keepalive message transmission interval on a Working CMTS or Protect CMTS. For more specific information, see the <i>Cisco IOS Interface Command Reference</i> on Cisco.com. |
|                  | <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.                                                                                                              |
|                  | <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured.                                                                                                       |

# hccp unlockout

To reverse the effects of the **hccp lockout** command—that is, to make a Working CMTS available for automatic switchover to Protect CMTS, use the **hccp unlockout** command in privileged EXEC mode.

**hccp group unlockout member**

Syntax Description

|               |                                                                                                     |
|---------------|-----------------------------------------------------------------------------------------------------|
| <i>group</i>  | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive. |
| <i>member</i> | The member number within the specified group.                                                       |

Command Default

By default, the **hccp unlockout** command is active for all groups and members.

Command Modes

Privileged EXEC

Command History

| Release                   | Modification                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
| 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
| 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |

Usage Guidelines

This command reverses the effect of the **hccp lockout** command. Once you have reconfigured or tested your Protect CMTS, issuing this command manually reintroduces the CMTS back into your 1+1 redundancy protection scheme.



Note

This command is applicable only on a Working CMTS in a given group. Issuing this command on a Protect CMTS has no effect.

Examples

The following example shows the lockout feature of a Working CMTS in group 1 being deactivated:

```
hccp 1 unlockout
```

| Related Commands | Command                    | Description                                                                                                                          |
|------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>hccp lockout</b>        | Prevents a Working CMTS from automatically switching to a Protect CMTS in the same group.                                            |
|                  | <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
|                  | <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# hccp working

To designate a cable interface on a CMTS in the specified group to be a Working CMTS, use the **hccp working** command in cable interface configuration mode. To remove a Working CMTS assignment, use the **no** form of this command.

**hccp group working member**

**no hccp group working member**

## Syntax Description

|               |                                                                                                      |
|---------------|------------------------------------------------------------------------------------------------------|
| <i>group</i>  | The group number for the specified interface. Valid values are any number from 1 to 255, inclusive.  |
| <i>member</i> | The member number for the specified interface. Valid values are any number from 1 to 255, inclusive. |

## Command Default

No default behavior or values

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release                   | Modification                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced for the Cisco uBR7200 series routers.                                                                                         |
| 12.1(7)EC1                | Support was added for the Cisco uBR-MC16S cable interface line card.                                                                                      |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC28C card.                                                |
| 12.2(8)BC2                | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router and Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, and Cisco uBR-LCP-MC16S cards. |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.           |

## Usage Guidelines

When N+1 HCCP redundancy is configured, the Protect interface switches over and becomes the active interface when it detects a situation similar to the following:

- The Working interface is removed from the chassis, is powered down, or is reset
- The Working interface crashes
- The Working interface no longer sends out regular keepalive messages
- The Working interface loses connectivity with the cable network

The Protect cable interface must be configured identically to the Working cable interface, which typically means the interfaces should be the same card type. However, when the Cisco uBR-MC16S is used, it can be used with either another Cisco uBR-MC16S card or a Cisco uBR-MC16C card.

Table 30 shows how a switchover affects the enhanced spectrum management features of the Cisco uBR-MC16S card.

**Table 0-33 Switchover Operation for a Cisco uBR-MC16C/Cisco uBR-MC16S Configuration**

| Working Cable Interface | Protect Cable Interface | Operation After Switchover                                                                                                                                                                                                                                        |
|-------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco uBR-MC16C         | Cisco uBR-MC16S         | The protect card (Cisco uBR-MC16S) uses the same upstream frequency as the working card, but after the system stabilizes, the protect card begins using the enhanced spectrum management features of the Cisco uBR-MC16S card, as configured on the protect CMTS. |
| Cisco uBR-MC16S         | Cisco uBR-MC16C         | The protect card (Cisco uBR-MC16C) uses the same upstream frequency as the working card. If the upstream becomes unstable, the Cisco uBR-MC16C performs only blind frequency hopping.                                                                             |
| Cisco uBR-MC16S         | Cisco uBR-MC16S         | The protect card initially uses the same upstream frequency as the working card, but after the system stabilizes, the protect card continues using the enhanced spectrum management features of the Cisco uBR-MC16S card.                                         |

### Examples

The following example shows cable interface 4/0 being designated as a Working CMTS interface as member number 2 of group 2:

```
Router(config)# interface cable 4/0
Router(config-if)# hccp 2 working 2
```

### Related Commands

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp protect</b>        | Configures a particular cable interface to protect another cable interface in the same group.                                        |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# hold-queue

To limit the size of the IP output queue on an interface, use the **hold-queue** command in interface configuration mode. To restore the default values, use the **no** form of this command.

**hold-queue** *length* {**in** | **out**}

**no hold-queue** {**in** | **out**}

## Syntax Description

|               |                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------|
| <i>length</i> | Integer that specifies the maximum number of packets in the queue. The range of valid values is from 0 to 65535. |
| <b>in</b>     | Specifies the input queue. The default is 75 packets. For asynchronous interfaces, the default is 10 packets.    |
| <b>out</b>    | Specifies the output queue. The default is 40 packets. For asynchronous interfaces, the default is 10 packets.   |

## Defaults

Input hold-queue limit is 75 packets.  
Output hold-queue limit is 40 packets.  
Asynchronous interfaces default is 10 packets.

## Command Modes

Interface configuration (config-if)

## Command History

| Release      | Modification                                                                                        |
|--------------|-----------------------------------------------------------------------------------------------------|
| 10.0         | This command was introduced.                                                                        |
| 11.1         | The <b>no hold-queue</b> command was added.                                                         |
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                               |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                     |
| 12.2(33)SCB  | This command was integrated into Cisco IOS Release 12.2(33)SCB.                                     |

## Usage Guidelines

### Defaults

The default limits of this command prevent a malfunctioning interface from consuming an excessive amount of memory. There is no fixed upper limit to a queue size.

### Back-to-Back Routing Updates

The default of 10 packets allows the Cisco IOS software to queue a number of back-to-back routing updates. This is the default for asynchronous interfaces only; other media types have different defaults.



### Hold Queues and Priority Queueing

- The hold queue stores packets received from the network that are waiting to be sent to the client. Cisco recommends that the queue size not exceed 10 packets on asynchronous interfaces. For most other interfaces, queue length should not exceed 100.
- The input hold queue prevents a single interface from flooding the network server with too many input packets. Further input packets are discarded if the interface has too many input packets outstanding in the system.
- If you are using priority output queueing, the length of the four output queues is set using the **priority-list** global configuration command. The **hold-queue** command cannot be used to set an output hold queue length in this situation.
- For slow links, use a small output hold-queue limit to prevent storing packets at a rate that exceeds the transmission capability of the link.
- For fast links, use a large output hold-queue limit. A fast link may be busy for a short time (and require the hold queue) but can empty the output hold queue quickly when capacity returns.
- You can display the current hold-queue setting and the number of packets that are discarded because of hold-queue overflows by using the **show interfaces** command in user EXEC mode.



#### Caution

Increasing the hold queue can have detrimental effects on network routing and response times. For protocols that use seq/ack packets to determine round-trip times, do not increase the output queue. Dropping packets instead informs hosts to slow down transmissions to match available bandwidth.

This is generally better than having duplicate copies of the same packet within the network (which can happen with large hold queues).

### Examples

The following example shows how to set a small input queue on a slow serial line:

```
Router(config)# interface serial 0
Router(config-if)# hold-queue 30 in
```

#### Cisco uBR10012 Universal Broadband Router

The following example shows how to modify the input hold queue on a Gigabit Ethernet SPA:

```
Router# configure terminal
Router(config)# interface GigabitEthernet3/0/0
Router(config-if)# hold-queue 30 in
```

### Related Commands

| Command                | Description                                                                       |
|------------------------|-----------------------------------------------------------------------------------|
| <b>priority-list</b>   | Establishes queueing priorities based on the protocol type.                       |
| <b>show interfaces</b> | Displays statistics for all interfaces configured on the router or access server. |

# hw-module bay reload

To reload the software and restart a SPA, use the **hw-module bay reload** command in privileged EXEC mode.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**hw-module bay *slot/subslot/bay* reload**

## Cisco IOS Release 12.2(33)SCB

**hw-module bay *slot/bay/port* reload**

|                           |                |                                                                                                 |
|---------------------------|----------------|-------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>slot</i>    | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
|                           | <i>subslot</i> | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.   |
|                           | <i>bay</i>     | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
|                           | <i>port</i>    | Specifies the interface number on the SPA.                                                      |

|                        |                               |
|------------------------|-------------------------------|
| <b>Command Default</b> | No default behavior or values |
|------------------------|-------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                                                                                                                            |
|------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                        |
|                        | 12.3(21)BC     | This command was introduced for the Cisco uBR10012 router.                                                                 |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                            |
|                        | 12.2(33)SCB    | This command was modified to change the addressing format for a SPA from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

|                         |                                                                                  |
|-------------------------|----------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>hw-module bay reload</b> command reloads the software and restarts a SPA. |
|-------------------------|----------------------------------------------------------------------------------|

|                 |                                                                                                                    |
|-----------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to reload the software for the Cisco Wideband SPA in slot 1, subslot 0, and bay 1. |
|                 | <pre>Router# hw-module bay 1/0/1 reload Router#</pre>                                                              |

|                         |                           |                                                   |
|-------------------------|---------------------------|---------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>            | <b>Description</b>                                |
|                         | <b>hw-module shutdown</b> | Shuts down a PRE1 module, line card, SIP, or SPA. |

# hw-module shutdown (ubr10012)

To shut down a particular Performance Routing Engine (PRE1) module, line card, Wideband SIP or Wideband SPA, use the **hw-module shutdown (ubr10012)** command in global configuration mode. To activate a specific PRE1, line card, Wideband SIP or Wideband SPA, use the **no** form of this command.

```
hw-module {main-cpu | pre {A|B} | sec-cpu | slot slot-number | subslot slot/subslot |
bay slot/subslot/bay} shutdown [unpowered]
```

```
no hw-module {main-cpu | pre {A|B} | sec-cpu | slot slot-number | subslot slot/subslot |
bay slot/subslot/bay} shutdown
```

| Syntax Description          |  |                                                                                                                                                                                                                                                                                                                |
|-----------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>main-cpu</b>             |  | Shuts down the PRE1 module that is currently acting as the active PRE1 module.                                                                                                                                                                                                                                 |
| <b>pre {A B}</b>            |  | Shuts down the PRE1 module that is physically in either PRE slot A (left slot) or PRE slot B (right slot).                                                                                                                                                                                                     |
| <b>sec-cpu</b>              |  | Shuts down the PRE1 module that is currently acting as the standby PRE1 module.                                                                                                                                                                                                                                |
| <b>slot slot-number</b>     |  | Shuts down the line cards that are physically present in the specified <i>slot-number</i> (valid range is 1 to 8).                                                                                                                                                                                             |
| <b>subslot slot/subslot</b> |  | Shuts down the line card or SIP that is physically present in the slot with the specified slot and subslot numbers. The following are the valid values: <ul style="list-style-type: none"> <li><i>slot</i> = 1 to 8</li> <li><i>subslot</i> = 0 or 1</li> </ul>                                                |
| <b>bay slot/subslot/bay</b> |  | Shuts down the SPA in the location specified by the <i>slot/subslot/bay</i> argument. The following are the valid values: <ul style="list-style-type: none"> <li><i>slot</i> = 1 to 3</li> <li><i>subslot</i> = 0 or 1 (0 is always specified)</li> <li><i>bay</i> = 0 (upper bay) or 1 (lower bay)</li> </ul> |
| <b>unpowered</b>            |  | Used with the Wideband SPA, shuts down the SPA and its interfaces, and leaves them in an administratively down state without power.                                                                                                                                                                            |

**Command Default** No default behavior or values

**Command Modes** Global configuration

| Command History | Release    | Modification                                                                |
|-----------------|------------|-----------------------------------------------------------------------------|
|                 | 12.2(4)XF  | This command was introduced for the Cisco uBR10012 router.                  |
|                 | 12.3(21)BC | Support was added for the Cisco Wideband SIP and Cisco 1-Gbps Wideband SPA. |

**Usage Guidelines**

The **hw-module shutdown (ubr10012)** command shuts down in a controlled manner a particular Performance Routing Engine (PRE1) module, line card, Wideband SIP or Wideband SPA. To activate a specific PRE1, line card, Wideband SIP, or Wideband SPA, use the **no** form of this command.

**Caution**

Shutting down the active PRE1 module will trigger a switchover, so that the standby PRE1 module becomes the active PRE1 module.

**Examples**

The following example shows the standby PRE1 module being shut down:

```
Router(config)# hw-module sec-cpu shutdown
Router(config)#
```

The following example shows the active PRE1 module being shut down (which will trigger a switchover to the standby PRE1 module):

```
Router(config)# hw-module main-cpu shutdown
Router(config)#
```

The following example shows the PRE1 module in PRE1 slot B being shut down:

```
Router(config)# hw-module pre B shutdown
Router(config)#
```

**Note**

The **hw-module pre B shutdown** command shuts down the PRE1 module that is physically present in slot B, regardless of whether the module is the active or standby PRE1 module.

The following example shows how to deactivate and verify deactivation for the Cisco Wideband SPA located in slot 1, subslot 0, bay 0. In the output of the **show hw-module bay oir** command, notice the “admin down” in the Operational Status field.

```
Router# configure terminal
Router(config)# hw-module bay 1/0/0 shutdown unpowered
%SPAWCMTS-4-SFP_MISSING: Wideband-Cable 1/0/0, 1000BASE-SX SFP missing from port 0
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:1, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:2, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:3, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:4, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:5, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:6, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:7, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:8, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:9, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:10, changed state to down
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:11, changed state to down
...
Router# show hw-module bay 1/0/0 oir
```

| Module    | Model         | Operational Status |
|-----------|---------------|--------------------|
| bay 1/0/0 | SPA-24XDS-SFP | admin down         |

The following example shows how to activate and verify activation for the Cisco Wideband SPA located in slot 1, subslot 0, bay 0. In the output of the **show hw-module bay oir** command, notice the “ok” in the Operational Status field.

```
Router# configure terminal
Router(config)# no hw-module bay 1/0/0 shutdown
```

```

%SPAUBCMST-4-SFP_OK: Wideband-Cable 1/0/0, 1000BASE-SX SFP inserted in port 0
%SPAUBCMST-4-SFP_LINK_OK: Wideband-Cable 1/0/0, port 0 link changed state to up
%SNMP-5-LINK_UP: LinkUp:Interface Wideband-Cable1/0/0:0 changed state to up
%LINK-3-UPDOWN: Interface Cable1/0/0:0, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:1, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:2, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:3, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:4, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:5, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:6, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:7, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:8, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:9, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:10, changed state to up
%LINK-3-UPDOWN: Interface Wideband-Cable1/0/0:11, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Wideband-Cable1/0/0:0, changed state to up
...
Router# show hw-module bay 1/0/0 oir

```

| Module    | Model         | Operational Status |
|-----------|---------------|--------------------|
| -----     | -----         | -----              |
| bay 1/0/0 | SPA-24XDS-SFP | ok                 |

## Related Commands

| Command                                                       | Description                                                             |
|---------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>hw-module reset</b>                                        | Resets a PRE1 module or line card.                                      |
| <b>hw-module reload</b>                                       | Reloads the software in and restarts a Cisco 1-Gbps Wideband SPA.       |
| <b>redundancy</b><br><b>force-failover</b><br><b>main-cpu</b> | Forces a manual switchover between the active and standby PRE1 modules. |

# hw-module slot pos

To configure a line card slot for Packet over SONET (POS) operation, use the **hw-module slot pos** command in privileged EXEC mode. To remove the configuration for a line card slot, use the **no** form of this command.

```
hw-module slot slot-number pos
no hw-module slot slot-number pos
```

|                    |             |                                                                                                         |
|--------------------|-------------|---------------------------------------------------------------------------------------------------------|
| Syntax Description | slot-number | Resets the line cards that are physically present in the specified slot-number (valid range is 1 to 8). |
|--------------------|-------------|---------------------------------------------------------------------------------------------------------|

|          |                               |
|----------|-------------------------------|
| Defaults | No default behavior or values |
|----------|-------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |             |                                                                                                                                         |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Command History | Release     | Modification                                                                                                                            |
|                 | 12.2(11)BC3 | This command was introduced for the Cisco uBR10012 OC-48 Dynamic Packet Transport (DPT) Interface Module for the Cisco uBR10012 router. |

**Usage Guidelines**

You must first use the **hw-module slot pos** command to preconfigure a line card slot for POS operation of the Cisco uBR10012 OC-48 DPT card before you can configure the card with any further commands. You must also use the **card 1oc48dpt/pos-1** command to configure the card slot for the proper card type.



**Note**

If you have previously used the **hw-module slot srp** command to configure line card slots for Spatial Reuse Protocol (SRP) operation, you must first cancel that configuration using the **no hw-module slot srp** command before you can configure the slots for POS operation using the **hw-module slot pos** command.

**Examples**

The following example shows the Cisco uBR10012 OC-48 DPT line card in slot 3 being configured for POS operation:

```
Router# hw-module slot 3 pos
Router# card 3/0 1oc48dpt/pos-1
```

The following example shows the Cisco uBR10012 OC-48 DPT line cards in slots 3 and 4 being reconfigured from SRP operation to POS operation:

```
Router# no hw-module slot 3 srp
Router# no hw-module slot 4 srp
Router# hw-module slot 3 pos
Router# card 3/0 1oc48dpt/pos-1
Router# hw-module slot 4 pos
```

```
Router# card 4/0 loc48dpt/pos-1
```

| Related Commands | Command                       | Description                                    |
|------------------|-------------------------------|------------------------------------------------|
|                  | hw-module reset               | Resets a PRE1 module or line card.             |
|                  | hw-module shutdown (ubr10012) | Shuts down a PRE1 module or line card.         |
|                  | hw-module slot srp            | Configures a line card slot for SRP operation. |

# hw-module slot srp

To configure a line card slot for Spatial Reuse Protocol (SRP) operation, use the **hw-module slot srp** command in privileged EXEC mode. To remove the configuration for a line card slot, use the **no** form of this command.

```
hw-module slot slot-number srp
no hw-module slot slot-number srp
```

|                    |             |                                                                                                         |
|--------------------|-------------|---------------------------------------------------------------------------------------------------------|
| Syntax Description | slot-number | Resets the line cards that are physically present in the specified slot-number (valid range is 1 to 8). |
|--------------------|-------------|---------------------------------------------------------------------------------------------------------|

|          |                               |
|----------|-------------------------------|
| Defaults | No default behavior or values |
|----------|-------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |             |                                                                                                                                         |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Command History | Release     | Modification                                                                                                                            |
|                 | 12.2(11)BC3 | This command was introduced for the Cisco uBR10012 OC-48 Dynamic Packet Transport (DPT) Interface Module for the Cisco uBR10012 router. |
|                 | 12.2(33)SCB | This command is obsolete.                                                                                                               |

**Usage Guidelines**

You must first use the **hw-module slot srp** command to preconfigure a line card slot for SRP operation of a pair of Cisco uBR10012 OC-48 DPT cards before you can configure the cards with any further commands. You must also use the **card loc48dpt/pos-1** command to configure each card slot for the proper card type.

  
Tip

The Cisco uBR10012 OC-48 DPT line cards support SRP operation only when installed in adjacent odd- and even-numbered slots (such as slots 1 and 2 or 3 and 4). You need to use the **hw-module slot srp** command only for the lower-numbered (odd-numbered) slot to preconfigure both slots of the SRP pair.

  
Note

If you have previously used the **hw-module slot pos** command to configure line card slots for Packet over SONET (POS) operation, you must first cancel that configuration using the **no hw-module slot pos** command before you can configure the slots for POS operation using the **hw-module slot srp** command.

**Examples**

The following example shows the Cisco uBR10012 OC-48 DPT line cards in slots 1 and 2 being configured for POS operation:

```
Router# hw-module slot 1 srp
Router# card 1/0 loc48dpt/pos-1
Router# card 2/0 loc48dpt/pos-1
```



The following example shows the Cisco uBR10012 OC-48 DPT line cards in slots 3 and 4 being reconfigured from POS operation to SRP operation:

```
Router# no hw-module slot 3 pos
Router# no hw-module slot 4 pos
Router# hw-module slot 3 srp
Router# card 3/0 1oc48dpt/pos-1
Router# card 4/0 1oc48dpt/pos-1
```

**Related Commands**

| Command                              | Description                                    |
|--------------------------------------|------------------------------------------------|
| <b>hw-module reset</b>               | Resets a PRE1 module or line card.             |
| <b>hw-module shutdown (ubr10012)</b> | Shuts down a PRE1 module or line card.         |
| <b>hw-module slot pos</b>            | Configures a line card slot for POS operation. |





## Cable Commands: i through p

Revised: August 12, 2013, OL-15510-17

### New Commands

| Command                             | Cisco IOS Software Release |
|-------------------------------------|----------------------------|
| packetcable gate send-subscriberID  | 12.3(23)BC1                |
| ipdr associate                      | 12.2(33)SCB                |
| ipdr collector                      | 12.2(33)SCB                |
| ipdr explorer start                 | 12.2(33)SCB                |
| ipdr session                        | 12.2(33)SCB                |
| ipdr session (global configuration) | 12.2(33)SCB                |
| ipdr template                       | 12.2(33)SCB                |
| issu linecard abortversion          | 12.2(33)SCB                |
| issu linecard acceptversion         | 12.2(33)SCB                |
| issu linecard changeversion         | 12.2(33)SCB                |
| issu linecard loadversion           | 12.2(33)SCB                |
| issu linecard prepareversion        | 12.2(33)SCB                |
| issu linecard reloadversion         | 12.2(33)SCB                |
| issu linecard runversion            | 12.2(33)SCB                |
| match-rule                          | 12.2(33)SCB                |
| init-tech-list                      | 12.2(33)SCC                |
| init-tech-ovr                       | 12.2(33)SCC                |
| interface integrated-cable          | 12.2(33)SCC                |
| interval                            | 12.2(33)SCC                |
| logging cmts sea                    | 12.2(33)SCC                |
| method                              | 12.2(33)SCC                |
| name                                | 12.2(33)SCC                |
| oui                                 | 12.2(33)SCC                |
| output-rate                         | 12.2(33)SCC                |

| Command                                   | Cisco IOS Software Release |
|-------------------------------------------|----------------------------|
| <b>override</b>                           | 12.2(33)SCC                |
| <b>policy</b>                             | 12.2(33)SCC                |
| <b>ipdr type</b>                          | 12.2(33)SCD2               |
| <b>prefix</b>                             | 12.2(33)SCC                |
| <b>license feature evaluation disable</b> | 12.2(33)SCE                |
| <b>license feature evaluation enable</b>  | 12.2(33)SCE                |
| <b>protect-tunnel</b>                     | 12.2(33)SCE                |
| <b>logging cmts ipc-cable</b>             | 12.2(33)SCF                |
| <b>ipdr exporter ack-timeout</b>          | 12.2(33)SCG                |
| <b>ipdr exporter keepalive</b>            | 12.2(33)SCG                |
| <b>ipdr exporter max-unacked</b>          | 12.2(33)SCG                |
| <b>periodic-rel-pxf_enable</b>            | 12.2(33)SCG2               |

#### Modified Commands

| Command                                   | Cisco IOS Software Release |
|-------------------------------------------|----------------------------|
| <b>member subslot</b>                     | 12.2(33)SCA                |
| <b>mode (redundancy)</b>                  | 12.2(33)SCA                |
| <b>ping docsis</b>                        | 12.2(33)SCA                |
| <b>interface cable</b>                    | 12.2(33)SCA                |
| <b>interface modular-cable</b>            | 12.2(33)SCB                |
| <b>interface wideband-cable</b>           | 12.2(33)SCB                |
| <b>ip accounting mac-address</b>          | 12.2(33)SCB                |
| <b>mac-address</b>                        | 12.2(33)SCB                |
| <b>mtu</b>                                | 12.2(33)SCB                |
| <b>negotiation</b>                        | 12.2(33)SCB                |
| <b>packetcable gate send-subscriberID</b> | 12.2(33)SCB                |
| <b>penalty-period</b>                     | 12.2(33)SCB                |
| <b>plim qos input map</b>                 | 12.2(33)SCB                |
| <b>ping docsis</b>                        | 12.2(33)SCC                |
| <b>interface cable</b>                    | 12.2(33)SCD                |
| <b>interface wideband-cable</b>           | 12.2(33)SCD                |
| <b>peak-time1</b>                         | 12.2(33)SCD2               |
| <b>penalty-period</b>                     | 12.2(33)SCD2               |
| <b>member subslot</b>                     | 12.2(33)SCC4               |
| <b>interface cable</b>                    | 12.2(33)SCE                |
| <b>interface modular-cable</b>            | 12.2(33)SCE                |

| Command                  | Cisco IOS Software Release |
|--------------------------|----------------------------|
| interface Wideband-Cable | 12.2(33)SCE                |
| mode (redundancy)        | 12.2(33)SCE                |
| interval                 | 12.2(33)SCE1               |
| ipdr template            | 12.2(33)SCG                |

# init-tech-list

To set the DCC initialization techniques that the CMTS can use to load balancing cable modems, use the **init-tech-list** command in the config-lb-group configuration mode. To reset the DCC initialization techniques, use the **no** form of this command.

**init-tech-list** *grouplist* [**ucc**]

**no init-tech-list**

|                    |                  |                                                                                                                            |
|--------------------|------------------|----------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>grouplist</i> | DCC initialization technique list.                                                                                         |
|                    | <b>ucc</b>       | (Optional) Determines whether Upstream Channel Change (UCC) can be used for modems during dynamic upstream load balancing. |

|                 |                                |
|-----------------|--------------------------------|
| Command Default | No default behavior or values. |
|-----------------|--------------------------------|

|               |                                                    |
|---------------|----------------------------------------------------|
| Command Modes | DOCSIS load balancing group mode (config-lb-group) |
|---------------|----------------------------------------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCC | This command was introduced. |

|          |                                                                                                                                                                 |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows how to set the DCC initialization techniques on a DOCSIS load balancing group on the CMTS, using the <b>init-tech-list</b> command. |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# init-tech-list 1 ucc
Router(config-lb-group)#
```

|                  |                                             |                                                                                                                         |
|------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Related Commands | Command                                     | Description                                                                                                             |
|                  | <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
|                  | <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |

# init-tech-ovr

To set DCC initialization techniques that override the physical upstream channel pair, use the **init-tech-ovr** command in the config-lb-group configuration mode.

## Cisco uBR10012 Router

```
init-tech-ovr cable slot/subslot/port upstream cable slot/subslot/port upstream
init-tech-list 0-4 [ucc]
```

## Cisco uBR7225VXR and Cisco uBR7246VXR Routers

```
init-tech-ovr cable slot/port upstream cable slot/port upstream init-tech-list 0-4 [ucc]
```

| Syntax Description                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b> slot/subslot/port upstream | Specifies the CMTS interface slot, subslot, port number, and upstream parameters that are to be overridden. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. Ther permitted range is from 5 to 8.</li> <li><i>subslot</i>—Subslot where the line card resides. The available slots are 0 or 1.</li> <li><i>port</i>—The downstream controller number on the line card. The permitted <i>port</i> range is from 0 to 4.</li> </ul>                           |
| <b>cable</b> slot/subslot/port upstream | Specifies the CMTS interface slot, subslot, port number, and upstream channel ID parameters that will override the CMTS interface and upstream channel.                                                                                                                                                                                                                                                                                                                                         |
| <b>cable</b> slot/port upstream         | Specifies the CMTS interface slot, port number, and upstream parameters that are to be overridden. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> </ul> </li> <li><i>port</i>—Downstream controller number on the line card. The permitted <i>port</i> values are 0 or 1.</li> </ul> |
| <b>cable</b> slot/port upstream         | Specifies the CMTS interface slot, port number, and upstream parameters that will override the CMTS interface and upstream channel.                                                                                                                                                                                                                                                                                                                                                             |
| <b>init-tech-list</b> 0-4               | Specifies the DCC initialization technique list ranging from 0 to 4 for the upstream channel pair.                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>ucc</b>                              | Determines whether Upstream Channel Change (UCC) can be used for modems during dynamic upstream load balancing.                                                                                                                                                                                                                                                                                                                                                                                 |

**Command Default** None

**Command Modes** DOCSIS load balancing group mode (config-lb-group)

**Command History**

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

**Usage Guidelines**

The **init-tech-list** command accepts an upstream that is not added into the load balancing group. The upstream channel pair is invalid until the upstream is added. When the load balancing group is removed, all upstream channel pairs are also removed.

**Examples**

The following example shows how to set DCC initialization techniques that override the physical upstream channel pair to a DOCSIS load balancing group on the CMTS, using the **init-tech-ovr** command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# init-tech-ovr cable 1/0 1 cable 1/1 2 1
```

**Related Commands**

| Command                                     | Description                                                                                                             |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
| <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |



# interface cable

To configure a cable interface, use the **interface cable** command in global configuration mode.

**interface cable** {*slot/port* | *slot/subslot/port*}

**Cisco IOS Release 12.2(33)SCE and later**

**interface cable** {*slot/cable-interface-index* | *slot/subslot/cable-interface-index*}

| Syntax Description           |                                                                                                                                                           |                                                                                                                                                                                                                                                                                    |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides.                                                                                                                         | <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li><li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li><li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li></ul>                                             |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                              |                                                                                                                                                                                                                                                                                    |
| <i>port</i>                  | Downstream port number.                                                                                                                                   | <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li><li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li></ul>                                                |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. | <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced.                                    |
|                 | 12.3(23)BC  | This command was integrated into Cisco IOS Release 12.3(23)BC.  |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. |

| Release     | Modification                                                                                                                                                                                                    |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCD | This command was modified to support Cisco uBR7225VXR and Cisco uBR7246VXR routers.                                                                                                                             |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

## Examples

The following example shows how to configure a cable interface in slot 5, and port 0 on a Cisco uBR7246VXR or Cisco uBR7225VXR router:

```
Router# configure terminal
Router(config)# interface cable 5/0
```

The following example shows how to configure a cable interface in slot 8, subslot 0, and port 0 on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable 8/0/0
```

The following example shows how to configure a Cisco uBR-MC3GX60V cable interface line card in slot 5, subslot 0, and cable interface index 13 (MAC domain index) on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable 5/0/13
```

## Related Commands

| Command                           | Description                             |
|-----------------------------------|-----------------------------------------|
| <b>interface integrated-cable</b> | Specifies a integrated cable interface. |
| <b>interface modular-cable</b>    | Specifies a modular cable interface.    |
| <b>interface wideband-cable</b>   | Specifies a wideband cable interface.   |

# interface cable-modem

To enter interface configuration mode for the cable interface on a router, use the **interface cable-modem** command in global configuration mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**interface cable-modem** *number*

|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> Identifies the cable interface (always <b>0</b> ). |
|---------------------------|------------------------------------------------------------------|

|                        |          |
|------------------------|----------|
| <b>Command Default</b> | Disabled |
|------------------------|----------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                   |
|------------------------|----------------|-----------------------------------------------------------------------|
|                        | 11.3(4)NA      | This command was introduced for the Cisco uBR904 cable access router. |
|                        | 12.0(4)XI1     | Support was added for the Cisco uBR924 cable access router.           |
|                        | 12.1(3)XL      | Support was added for the Cisco uBR905 cable access router.           |
|                        | 12.1(5)XU1     | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                        | 12.2(2)XA      | Support was added for the Cisco uBR925 cable access router.           |

|                         |                                                                                                                   |
|-------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | When this command is entered, the router switches from global configuration mode to interface configuration mode. |
|-------------------------|-------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                                          |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enter interface configuration mode for the router's cable interface and then to enter the available interface configuration commands: |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router(config)# interface cable-modem 0
Router(config-if)# cable-modem ?
 compliant Enter compliant modes for interface
 downstream Downstream channel characteristics
 fast-search Enable/disable the DS fast search
 upstream upstream channel characteristics
 voip Options for Voice over IP traffic over the cable interface

Router(config-if)#
```

| <b>Related Commands</b> | <b>Command</b>                              | <b>Description</b>                                                                             |
|-------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------|
|                         | <b>cable-modem compliant bridge</b>         | Enables DOCSIS-compliant bridging on the cable interface.                                      |
|                         | <b>cable-modem downstream saved channel</b> | Modifies the saved downstream channel setting and upstream power value on the cable interface. |

|                                           |                                                                                                    |
|-------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>cable-modem upstream preamble qpsk</b> | Enables the QPSK modulation scheme in the upstream direction from the cable interface to the CMTS. |
| <b>cable-modem voip best-effort</b>       | Allows voice traffic to be transmitted on the upstream using a best-effort QoS.                    |

# interface gigabitethernet

The **interface gigabitethernet** command is now documented as the **gigabitethernet** keyword of the **interface** command. For more information, see the **interface** command.

# interface integrated-cable

To configure integrated cable interface, use the **interface integrated-cable** command in global configuration mode.

**Cisco uBR10012 Universal Broadband Router**

```
interface integrated-cable slot/subslot/port:rf-channel
```

**Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Router**

```
interface integrated-cable slot/port:rf-channel
```

|                    |            |                                                                                                                                                                                                                                                                                                                 |
|--------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | slot       | Identifies the chassis slot where the cable interface line card resides. <ul style="list-style-type: none"><li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li><li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li><li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li></ul> |
|                    | subslot    | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                    |
|                    | port       | Downstream port number. <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li><li>• Cisco uBR10012 router—The valid range is from 0 to 4.</li></ul>                                                                                        |
|                    | rf-channel | RF channel number. The valid range is from 0 to 3.                                                                                                                                                                                                                                                              |

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCC | This command was introduced. |

|                  |                                                                                                                       |
|------------------|-----------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>interface integrated-cable</b> command is supported only on Cisco uBR-MC88V and Cisco UBR-MC20X20V line cards. |
|------------------|-----------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to configure a integrated cable interface in slot 7, subslot 0, and port 0 on a Cisco UBR-MC20X20V cable interface line card:</p> <pre>Router# configure terminal Router(config)# interface integrated-cable 7/0/0:1</pre> |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Associated Features**

The **interface integrated-cable** command is used to configure the following:

- [Configuring the Cisco UBR-MC20X20V Cable Interface Line Card](#)
- [Configuring the Cisco uBR-MC88V Cable Interface Line Card](#)

**Related Commands**

| Command                                | Description                                                              |
|----------------------------------------|--------------------------------------------------------------------------|
| <b>show interface integrated-cable</b> | Displays the current configuration and status for an integrated channel. |

# interface modular-cable

To configure a modular cable interface, use the **interface modular-cable** command in global configuration mode.

**Cisco IOS Releases 2.3(21)BC, 12.3(23)BC, and 12.2(33)SCA**

**interface modular-cable** *slot/subslot/bay:nb-channel-number*

**Cisco IOS Release 12.2(33)SCB**

**interface modular-cable** *slot/bay/port:nb-channel-number*

**Cisco IOS Release 12.2(33)SCE**

**interface modular-cable** *slot/{subslot | bay}/port:interface-number*

| Syntax Description       |                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>              | Identifies the chassis slot where the Cisco Cable line card, or Cisco Wideband Shared Port Adaptor (SPA) is located.                  | <ul style="list-style-type: none"> <li>For the Cisco Cable line cards, the valid range is from 5 to 8.</li> <li>For the Cisco Wideband SPA, the valid values are: <ul style="list-style-type: none"> <li><i>slot</i>—1 or 3 (for SIP-600)</li> <li><i>slot</i>—1 (for Wideband SIP)</li> </ul> </li> </ul> <p><b>Note</b> In Cisco IOS Release 12.2(33)SCE, support for configuring modular-cable interface on the Cisco uBR-MC3GX60V cable line card is introduced.</p> |
| <i>subslot</i>           | Identifies the subslot where the Cisco Cable line card is located.                                                                    | <ul style="list-style-type: none"> <li>For the Cisco Cable line cards, the valid value is 0 or 1.</li> </ul> <p><b>Note</b> In Cisco IOS Release 12.2(33)SCE, support for configuring modular-cable interface on the Cisco uBR-MC3GX60V cable line card is introduced.</p>                                                                                                                                                                                               |
| <i>bay</i>               | Identifies the bay where the Cisco Wideband SPA is located.                                                                           | The valid range is from 0 to 3.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>port</i>              | Identifies the port on the Cisco Cable line card, or the Cisco Wideband SPA in the specified <i>slot/subslot</i> or <i>slot/bay</i> . | <ul style="list-style-type: none"> <li>For the Cisco UBR-MC20X20V cable interface line card, the valid range for is from 0 to 5.</li> <li>For the Cisco uBR-MC3GX60V cable interface line card, the valid range is from 0 to 2.</li> <li>For the Cisco Wideband SPA, the valid value is 0.</li> </ul>                                                                                                                                                                    |
| <i>nb-channel-number</i> | Identifies the narrowband channel number.                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>interface-number</i>  | Identifies the modular-cable interface number. The valid range is from 0 to 23.                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



**Command Default** None

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                                                                                                                                         |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced.                                                                                                                                                         |
|                 | 12.3(23)BC  | This command was integrated into Cisco IOS Release 12.3(23)BC.                                                                                                                       |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                      |
|                 | 12.2(33)SCB | This command was modified to change the addressing format for the modular cable interface from <i>slot/subslot/bay:nb-channel-number</i> to <i>slot/bay/port:nb-channel-number</i> . |
|                 | 12.2(33)SCE | Support for configuring modular-cable interface on the Cisco uBR-MC3GX60V cable line card was introduced.                                                                            |

**Examples** The following example shows how to configure a modular cable interface in slot 1, bay 3, and channel 23 on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface modular-cable 1/3/0:23
```

The following example shows how to configure a modular cable interface in slot 5, subslot 1, and port 2 on a Cisco uBR-MC3GX60V cable line card.

```
Router# configure terminal
Router(config)# interface modular-cable 5/1/2:0
```

| Related Commands | Command                         | Description                                                      |
|------------------|---------------------------------|------------------------------------------------------------------|
|                  | <b>cable attribute-mask</b>     | Specifies an attribute mask value for a modular cable interface. |
|                  | <b>interface wideband-cable</b> | Specifies a wideband cable interface.                            |
|                  | <b>interface cable</b>          | Specifies a cable interface.                                     |

# interface port-channel

To create an EtherChannel interface on the Cisco Cable Modem Termination System (CMTS), use the **interface port-channel** command in global configuration mode. To remove this EtherChannel port from the Cisco CMTS, use the **no** form of this command.

**interface port-channel** *n*

**no interface port-channel** *n*

## Syntax Description

|               |                                                                                               |
|---------------|-----------------------------------------------------------------------------------------------|
| <i>number</i> | Identifying port channel number for this interface (EtherChannel port). The range is 1 to 64. |
|---------------|-----------------------------------------------------------------------------------------------|

## Command Default

By default, EtherChannel groups and ports are not defined, and they are disabled (**off** mode) configured.

## Command Modes

Global configuration

## Command History

| Release     | Modification                                                |
|-------------|-------------------------------------------------------------|
| 12.2(11)BC3 | This command was introduced on the Cisco uBR7246VXR router. |
| 12.2(9a)BC  | This command was introduced on the Cisco uBR10012 router.   |

## Usage Guidelines

The first EtherChannel interface configured becomes the bundle master for all EtherChannel interfaces in the group. That is, the MAC address of the first EtherChannel interface is the MAC address for all EtherChannel interfaces in the group. If the first EtherChannel interface is later removed, the second EtherChannel interface to be configured becomes the bundled master by default.

Repeat this configuration on every EtherChannel port to be bundled into a FastEtherChannel (FEC) or GigabitEtherChannel (GEC) group. This configuration must be present on all EtherChannel interfaces before the EtherChannel group can be configured.

For additional information about using the EtherChannel feature on the Cisco CMTS, refer to the following document on Cisco.com:

- *EtherChannel for the Cisco CMTS*

## Examples

The following example configures the port to have an EtherChannel port number of 1 within its EtherChannel group. The EtherChannel group is defined with the **channel-group** command.

```
Router(config-if)# interface port-channel 1
```

## Related Commands

| Command                            | Description                                                                                           |
|------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>channel-group</b>               | Assigns an EtherChannel port to an EtherChannel group.                                                |
| <b>show interface port-channel</b> | Displays the EtherChannel interfaces and channel identifiers, with their mode and operational status. |

# interface usb

To enter the interface configuration mode for the Universal Serial Bus (USB) interface, use the **interface usb** command in global configuration mode.

**Cisco uBR925 cable access router, Cisco CVA122 Cable Voice Adapter**

**interface usb** *number*

|                           |                                                                |
|---------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> Identifies the USB interface (always <b>0</b> ). |
|---------------------------|----------------------------------------------------------------|

|                        |          |
|------------------------|----------|
| <b>Command Default</b> | Disabled |
|------------------------|----------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                   |
|------------------------|----------------|-----------------------------------------------------------------------|
|                        | 12.1(5) XU1    | This command was introduced for the Cisco CVA122 Cable Voice Adapter. |
|                        | 12.2(2)XA      | Support was added for the Cisco uBR925 cable access router.           |

|                         |                                                                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | When this command is entered, the router switches from global configuration mode to interface configuration mode for the USB interface. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enter interface configuration mode for the USB interface and then to display the available commands: |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|

```
Router(config)# interface usb 0
Router(config-if)#?
Interface configuration commands:
 access-expression Build a bridge boolean access expression
 arp Set arp type (arpa, probe, snap) or timeout
 bandwidth Set bandwidth informational parameter
 bridge-group Transparent bridging interface parameters
 carrier-delay Specify delay for interface transitions
 cdp CDP interface subcommands
 crypto Encryption/Decryption commands
 custom-queue-list Assign a custom queue list to an interface
 default Set a command to its defaults
 delay Specify interface throughput delay
 description Interface specific description
 exit Exit from interface configuration mode
 fair-queue Enable Fair Queuing on an Interface
 h323-gateway Configure H323 Gateway
 help Description of the interactive help system
 hold-queue Set hold queue depth
 ip Interface Internet Protocol config commands
 keepalive Enable keepalive
```

interface usb

|                        |                                                               |
|------------------------|---------------------------------------------------------------|
| load-interval          | Specify interval for load calculation for an interface        |
| logging                | Configure logging for interface                               |
| mac-address            | Manually set interface MAC address                            |
| max-reserved-bandwidth | Maximum Reservable Bandwidth on an Interface                  |
| mtu                    | Set the interface Maximum Transmission Unit (MTU)             |
| no                     | Negate a command or set its defaults                          |
| ntp                    | Configure NTP                                                 |
| priority-group         | Assign a priority group to an interface                       |
| random-detect          | Enable Weighted Random Early Detection (WRED) on an Interface |
| service-policy         | Configure QoS Service Policy                                  |
| shutdown               | Shutdown the selected interface                               |
| snmp                   | Modify SNMP interface parameters                              |
| standby                | Interface HSRP configuration commands                         |
| timeout                | Define timeout values for this interface                      |
| traffic-shape          | Enable Traffic Shaping on an Interface or Sub-Interface       |
| transmit-interface     | Assign a transmit interface to a receive-only interface       |
| tx-ring-limit          | Configure PA level transmit ring limit                        |

Router(config-if)#

| Related Commands | Command              | Description                                                           |
|------------------|----------------------|-----------------------------------------------------------------------|
|                  | show controllers usb | Displays the high-level controller information for the USB interface. |
|                  | show interfaces usb  | Displays configuration information about the USB interface.           |

# interface wideband-cable

To configure a wideband cable interface, use the **interface wideband-cable** command in global configuration mode.

## Cisco uBR10012 Universal Broadband Router

Cisco IOS Releases 12.3(21)BC, 12.3(23)BC, and 12.2(33)SCA

**interface wideband-cable** *slot/subslot/bay:wideband-channel*

Cisco IOS Release 12.2(33)SCB

**interface wideband-cable** *slot/bay/port:wideband-channel*

Cisco IOS Release 12.2(33)SCC

**interface wideband-cable** *slot/{subslot | bay}/port:wideband-channel*

Cisco IOS Release 12.2(33)SCE

**interface wideband-cable** *slot/subslot/controller:bonded-channel*

## Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers

Cisco IOS Release 12.2(33)SCD

**interface wideband-cable** *slot/port:wideband-channel*

| Syntax Description    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>           | The slot where a SIP or cable line card resides.                                    | <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>• Cisco uBR10012 router—The valid range for:               <ul style="list-style-type: none"> <li>– Cable line card is from 5 to 8</li> <li>– SIP is 1 and 3</li> </ul> </li> </ul>             |
| <i>subslot</i>        | The subslot where a SIP or cable line card resides.                                 | <ul style="list-style-type: none"> <li>• Cisco uBR10012 router—The valid value for:               <ul style="list-style-type: none"> <li>– Cable line card in slot 5 to 8 is 0 or 1</li> <li>– SPAs in a SIP in slot 1 or 3, prior to Cisco IOS Release 12.2(33)SCB is 0 or 1. For Cisco IOS Release 12.2(33)SCB and later, subslot is not specified.</li> </ul> </li> </ul> |
| <i>bay</i>            | The bay in a SIP where a SPA is located. The valid range is from 0 to 3.            |                                                                                                                                                                                                                                                                                                                                                                              |
| <i>controller</i>     | Controller index for the modular cable. The valid range is from 0 to 2.             |                                                                                                                                                                                                                                                                                                                                                                              |
| <i>bonded-channel</i> | Bonding Group Channel index for the modular cable. The valid range is from 0 to 31. |                                                                                                                                                                                                                                                                                                                                                                              |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>port</i>             | <p>Specifies the port number.</p> <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router and Cisco uBR7225VXR router—The valid range is from 0 to 1.</li> <li>• Cisco uBR10012 router—The valid value for: <ul style="list-style-type: none"> <li>– Slot 1 and 3 is 0</li> <li>– Slot 5 to 8 is from 0 to 4</li> </ul> </li> </ul>                                                                                               |
| <i>wideband-channel</i> | <p>Represents the wideband channel number.</p> <ul style="list-style-type: none"> <li>• Cisco uBR10012 router—The valid range for: <ul style="list-style-type: none"> <li>– Cisco UBR-MC20X20V cable interface line card is from 0 to 5.</li> <li>– Cisco uBR-MC3GX60V cable interface line card and SPAs is from 0 to 31.</li> </ul> </li> <li>• Cisco uBR7246VXR and Cisco uBR7225VXR routers—The valid range is from 0 to 5.</li> </ul> |

**Command Default** None

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                                                                                                                                        |
|-----------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced.                                                                                                                                                        |
|                 | 12.3(23)BC  | This command was integrated into Cisco IOS Release 12.3(23)BC.                                                                                                                      |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                     |
|                 | 12.2(33)SCB | This command was modified to change the addressing format for the wideband cable interface from <i>slot/subslot/bay:wideband-channel</i> to <i>slot/bay/port:wideband-channel</i> . |
|                 | 12.2(33)SCD | This command was modified. Support was added for Cisco uBR7225VXR and Cisco uBR7246VXR routers.                                                                                     |
|                 | 12.2(33)SCE | Support was added for Cisco uBR-MC3GX60V cable interface line card on the Cisco uBR10012 router.                                                                                    |

## Examples

The following example shows how to configure a wideband cable interface in slot 1, bay 3, and port 0 on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface wideband-cable 1/3/0:0
```

The following example shows how to configure a wideband cable interface in slot 5, subslot 1, and port 2 on a Cisco uBR-MC3GX60V cable line card.

```
Router# configure terminal
Router(config)# interface wideband-cable 5/1/2:0
```

The following example shows how to configure a wideband cable interface in slot 1, and port 0 on a Cisco uBR7225VXR or Cisco uBR7246VXR router:

```
Router# configure terminal
Router(config)# interface wideband-cable 1/0:0
```

**Related Commands**

| Command                                | Description                                                       |
|----------------------------------------|-------------------------------------------------------------------|
| <b>cable downstream attribute-mask</b> | Specifies an attribute mask value for a wideband cable interface. |
| <b>interface modular-cable</b>         | Specifies a modular cable interface.                              |
| <b>interface cable</b>                 | Specifies a cable interface.                                      |

# interval

To set the duration of time the CMTS waits before checking the load on an interface, use the **interval** command in the load balancing group configuration mode. To reset the duration of time, use the **no** form of this command.

**interval** *seconds*

**no interval**

|                           |                |                                                                                                                                                                                                                                                                                        |
|---------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>seconds</i> | The polling interval for the CMTS to determine the current load on each cable interface. The valid range is from 1 to 1000. The default value is 10 seconds in Cisco IOS Release 12.2(33)SCE and earlier. The default value is 30 seconds in Cisco IOS Release 12.2(33)SCE1 and later. |
|---------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                                                      |
|----------------------|------------------------------------------------------|
| <b>Command Modes</b> | Load balancing group configuration (config-lb-group) |
|----------------------|------------------------------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                      |
|------------------------|----------------|----------------------------------------------------------------------------------------------------------|
|                        | 12.2(33)SCC    | This command was introduced.                                                                             |
|                        | 12.2(33)SCE1   | This command was modified. The default value for this command was changed from 10 seconds to 30 seconds. |

|                 |                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | <p>The following example shows how to set the duration of time that the CMTS waits before checking the load on the interface, using the <b>interval</b> command.</p> <pre>Router# configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)# cable load-balance docsis-group 1 Router(config-lb-group)# interval 50 Router(config-lb-group)#</pre> |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Related Commands</b> | <b>Command</b>                              | <b>Description</b>                                                                                                      |
|-------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                         | <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
|                         | <b>show cable load-balance docsis-group</b> | Displays real time configuration, statistical, and operational information for load balancing operations on the router. |



# ip-address (controller)

To set the IP address of the Wideband SPA FPGA, use the **ip-address (controller)** command in controller configuration mode. To remove the IP address of the Wideband SPA FPGA, use the **no** form of this command.

**ip-address** *ip-address*

**no ip-address** *ip-address*

## Syntax Description

|                   |                                       |
|-------------------|---------------------------------------|
| <i>ip-address</i> | IP address for the Wideband SPA FPGA. |
|-------------------|---------------------------------------|

## Command Default

No IP address is set for the Wideband SPA FPGA.

## Command Modes

Controller configuration (config-controller)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

## Usage Guidelines

Use this command to set the IP address for the Wideband SPA FPGA. This address is used as the source IP address for packets that the Wideband SPA transmits to the EQAM device.

## Examples

The following example shows how to set the IP address of the Wideband SPA FPGA. The SPA is located in slot 1, subslot 0, bay 0.

```
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# ip-address 192.168.200.6
```

## Related Commands

| Command                                           | Description                                                                    |
|---------------------------------------------------|--------------------------------------------------------------------------------|
| <b>annex modulation</b>                           | Sets the annex and modulation for the Wideband SPA.                            |
| <b>cable rf-channel</b>                           | Associates an RF channel on a Wideband SPA with a wideband channel.            |
| <b>controller modular-cable</b>                   | Enters controller configuration mode to configure the Wideband SPA controller. |
| <b>modular-host subslot</b>                       | Specifies the modular-host line card.                                          |
| <b>rf-channel frequency</b>                       | Sets the frequency for each RF channel.                                        |
| <b>rf-channel ip-address mac-address udp-port</b> | Sets the IP address, MAC address and UDP port for each RF channel.             |
| <b>rf-channel network delay</b>                   | Specifies the CIN delay for each RF channel.                                   |

| Command                                       | Description                                       |
|-----------------------------------------------|---------------------------------------------------|
| <b>rf-channel description</b>                 | Specifies the description for each RF channel.    |
| <b>rf-channel cable downstream channel-id</b> | Assigns a downstream channel ID to an RF channel. |

# ip address docsis

To specify that the cable access router should use the DHCP protocol, as required by the DOCSIS specification, to assign an IP address for its cable interface, use the **ip address docsis** command in cable interface configuration mode. To disable the use of DHCP, use the **no** form of this command.

**Cisco uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**ip address docsis**

**no ip address docsis**

## Syntax Description

There are no key words or arguments for this command.

## Command Default

The cable access router uses the DHCP protocol, as required by the DOCSIS specification, to assign an IP address to its cable interface during system power-on.

## Command Modes

Interface configuration (cable interface only)

## Command History

| Release    | Modification                                                          |
|------------|-----------------------------------------------------------------------|
| 12.1(3)XL  | This command was introduced for the Cisco uBR905 cable access router. |
| 12.1(4)T   | Support was added for the Cisco uBR924 cable access router.           |
| 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.           |
| 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
| 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.           |

## Usage Guidelines

The **ip address docsis** command configures the cable access router so that it obtains its IP address from a DHCP server at system power-on, which is a requirement for DOCSIS operation. This is the default mode of operation. If the configuration for the cable interface does not include any form of **ip address** command, the cable access router defaults to configuring the cable interface with the **ip address docsis** command.

Configuring the cable interface with any other form of the **ip address** command or with the **no ip address docsis** command prevents the cable access router from operating in DOCSIS networks. This mode of operation should be used only in lab or test networks.



### Note

Earlier Cisco IOS software releases for the cable access routers used either the **ip address negotiated** or the **ip address dhcp** command to specify that the cable interface should obtain its IP address from a DHCP server. These commands should no longer be used to configure the router's cable interface.

Examples

The following example shows how to configure the cable access router so that it obtains the IP address for its cable interface from a DHCP server:

```
Router(config)# interface cable-modem 0
Router(config-if)# ip address docsis
Router(config-if)# exit
Router(config)#
```

Related Commands

| Command                       | Description                                                                                                                     |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>cable-modem dhcp-proxy</b> | Specifies that a DHCP server should provide the IP address for the router's Ethernet interface or for a NAT address pool.       |
| <b>ip http dhcp</b>           | Specifies the use of the DHCP protocol to obtain an IP address for any interface except the cable interface at system power-on. |
| <b>ip http negotiated</b>     | Specifies that a serial interface should use the PPP/PCP to obtain an IP address at system power-on                             |

# ip http cable-monitor

To enable the cable access router's onboard Cable Monitor web server, use the **ip http cable-monitor** command in global configuration mode. To disable the Cable Monitor and turn off all access to the onboard Cisco web server, use the **no** form of this command.

**Cisco uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**ip http cable-monitor** { **basic** | **advance** } [*url-ip-address url-mask*]

**no ip http cable-monitor**

| Syntax Description | <b>basic</b>          | Displays only the basic status and performance pages.                                                                                                                                                                                                                                                                                       |
|--------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <b>advance</b>        | Displays all status and diagnostic pages.                                                                                                                                                                                                                                                                                                   |
|                    |                       | <b>Note</b> The Cable Monitor should not be used in advanced mode without first implementing a secure password strategy on the cable access router. Enabling the Cable Monitor in advanced mode without setting an encrypted enabled password could provide information that would allow remote users to change the router's configuration. |
|                    | <i>url-ip-address</i> | (Optional) Specifies the IP address for the Cable Monitor. This argument, along with the <i>url-mask</i> argument, also defines the network that provides the IP address pool used by the temporary DHCP server when the cable interface goes down.                                                                                         |
|                    | <i>url-mask</i>       | (Optional) Specifies the subnet mask for the Cable Monitor. This argument, along with the <i>url-ip-address</i> argument, also defines the network that provides the IP address pool used by the temporary DHCP server when the cable interface goes down.                                                                                  |
|                    |                       |                                                                                                                                                                                                                                                                                                                                             |

**Command Default**

For *url-ip-address*, 192.168.100.1

For *url-mask*, 255.255.255.0

**Command Modes**

Global configuration

| Command History | <b>Release</b> | <b>Modification</b>                                                  |
|-----------------|----------------|----------------------------------------------------------------------|
|                 | 12.1(1)T       | This command is introduced for the Cisco uBR924 cable access router. |
|                 | 12.1(3)XL      | Support was added for the Cisco uBR905 cable access router.          |
|                 | 12.1(5)XU1     | Support was added for the Cisco CVA122 Cable Voice Adapter.          |
|                 | 12.2(2)XA      | Support was added for the Cisco uBR925 cable access router.          |

**Usage Guidelines**

This command enables the Cable Monitor, an onboard web server that displays current status, troubleshooting, and performance information. The Cable Monitor can be accessed in two ways:

- When the cable access router has established connectivity with the CMTS over the cable interface, a service technician can use a web browser to remotely access the router and display the desired information.
- When the cable network is not operational and the cable access router is not online, the subscriber can access the tool with a PC connected to the router's Ethernet ports. Technicians can then prompt the user for the information they need to determine the source of the problem.

Enabling the Cable Monitor also enables the Cisco web server that is onboard the cable access router, which is the equivalent to entering the **ip http server** command. However, when the Cable Monitor is enabled, all other access, including CLI access, to the onboard web server is automatically disabled.

**Note**

When the Cable Monitor is enabled in the startup configuration file, the messages “Starting DNS process” and “Terminating DNS process” can appear in the messages displayed during boot-up on the console. These messages are normal and can be ignored.

Disabling the Cable Monitor using the **no ip http cable-monitor** command also automatically disables the Cisco web server, which is the equivalent of giving the **no ip http server** command. When disabling the Cable Monitor, the console might display warning messages similar to the following:

```
% monitor-209.165.202.131 is not in the database.
% monitor-192.168.100.1 is not in the database.
% Range [209.165.202.131, 209.165.202.131] is not in the database.
% Range [192.168.100.1, 192.168.100.1] is not in the database.
```

These messages can be ignored because they are simply confirming that the IP addresses used for the Cable Monitor are no longer being used for that purpose.

The *URL-IP-address* and *URL-mask* arguments also specify that the class C private network 192.168.100.0 is the default address pool for the temporary DHCP server that activates when the cable interface goes down.

**Note**

The Cable Monitor web interface does not work with the Cisco Easy VPN Remote web interface. To access the Cable Monitor web interface, you must first disable the Cisco Easy VPN Remote web interface with the **no ip http ezvpn** command, and then enable the Cable Monitor with the **ip http cable-monitor** command.

**Examples**

The following example shows how to enable the Cable Monitor for advanced mode, in which all status and diagnostic pages are displayed:

```
Router(config)# ip http cable-monitor advance
Router(config)#
```

The following example shows how to disable both the Cable Monitor and the Cisco web server, preventing all web server access to the Cisco uBR924 cable access router:

```
Router(config)# no ip http cable-monitor
Router(config)#
```

**Related Commands**

| Command               | Description                                                                                                           |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>ip http ezvpn</b>  | Enables the enable the Cisco Easy VPN Remote web server interface.                                                    |
| <b>ip http port</b>   | Configures the TCP port number for the router's HTTP web server. The default is the well-known web server port of 80. |
| <b>ip http server</b> | Enables and disables the router's HTTP web server.                                                                    |

**Note**

The **ip http** command also supports two options, **access-class** and **authentication**, that should not be used when the Cable Monitor is enabled.

# ip http ezvpn

To enable the Cisco Easy VPN Remote web server interface, use the **ip http ezvpn** command in global configuration mode. To disable the Cisco Easy VPN Remote web interface, use the **no** form of this command.

Cisco uBR905 and BR925 cable access routers

**ip http ezvpn**

**no ip http ezvpn**

Syntax Description

This command has no keywords or arguments.

Command Default

The Cisco Easy VPN Remote web interface is disabled by default.

Command Modes

Global configuration

Command History

| Release              | Modification                                                                            |
|----------------------|-----------------------------------------------------------------------------------------|
| 12.2(8)YJ, 12.2(15)T | This command was introduced for the Cisco uBR905 and Cisco uBR925 cable access routers. |

Usage Guidelines

This command enables the Cisco Easy VPN Remote web server, an onboard web server that allows users to connect an IPSec Easy VPN tunnel and to provide the required authentication information. This allows the user to perform these functions without having to use the Cisco command-line interface.

Before using this command, you must first enable the Cisco web server that is onboard the cable access router by entering the **ip http server** command. Then use the **ip http ezvpn** command to enable the Cisco Easy VPN Remote web server. You can then access the web server by entering the IP address for the router's Ethernet interface in your web browser.



Note

The Cisco Easy VPN Remote web interface does not work with the Cable Monitor web interface in Cisco IOS Release 12.2(8)YJ. To access the Cable Monitor web interface, you must first disable the Cisco Easy VPN Remote web interface with the **no ip http ezvpn** command, and then enable the Cable Monitor with the **ip http cable-monitor** command.

Examples

The following example shows how to enable the Cisco Easy VPN Remote web server interface:

```
Router# configure terminal
Router(config)# ip http server
Router(config)# ip http ezvpn
Router(config)# exit
Router# copy running-config startup-config
```



| Related Commands | Command                                                    | Description                                                                                                           |
|------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|                  | <b>clear crypto ipsec client ezvpn</b>                     | Resets the Cisco Easy VPN Remote state machine and bring down the Cisco Easy VPN Remote connection.                   |
|                  | <b>crypto ipsec client ezvpn xauth</b>                     | Responds to a pending VPN authorization request.                                                                      |
|                  | <b>crypto ipsec client ezvpn (global configuration)</b>    | (Global configuration mode) Creates a Cisco Easy VPN Remote configuration.                                            |
|                  | <b>crypto ipsec client ezvpn (interface configuration)</b> | (Interface configuration mode) Assigns a Cisco Easy VPN Remote configuration to an interface.                         |
|                  | <b>crypto ipsec client ezvpn connect</b>                   | Manually connects to a specified IPSec VPN tunnel.                                                                    |
|                  | <b>ip http cable-monitor</b>                               | Enables and disables the Cable Monitor web server feature.                                                            |
|                  | <b>ip http port</b>                                        | Configures the TCP port number for the router's HTTP web server. The default is the well-known web server port of 80. |
|                  | <b>ip http server</b>                                      | Enables and disables the router's HTTP web server.                                                                    |

# ip-address (controller)

To set the IP address of the Wideband SPA FPGA, use the **ip-address (controller)** command in controller configuration mode. To remove the IP address of the Wideband SPA FPGA, use the **no** form of this command.

**ip-address** *ip-address*

**no ip-address** *ip-address*

## Syntax Description

*ip-address* IP address for the Wideband SPA FPGA.

## Command Default

No IP address is set for the Wideband SPA FPGA.

## Command Modes

Controller configuration (config-controller)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. |

## Usage Guidelines

Use this command to set the IP address for the Wideband SPA FPGA. This address is used as the source IP address for packets that the Wideband SPA transmits to the EQAM device.

## Examples

The following example shows how to set the IP address of the Wideband SPA FPGA. The SPA is located in slot 1, subslot 0, bay 0.

```
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# ip-address 192.168.200.6
```

## Related Commands

| Command                                           | Description                                                                    |
|---------------------------------------------------|--------------------------------------------------------------------------------|
| <b>annex modulation</b>                           | Sets the annex and modulation for the Wideband SPA.                            |
| <b>cable rf-channel</b>                           | Associates an RF channel on a Wideband SPA with a wideband channel.            |
| <b>controller modular-cable</b>                   | Enters controller configuration mode to configure the Wideband SPA controller. |
| <b>modular-host subslot</b>                       | Specifies the modular-host line card.                                          |
| <b>rf-channel frequency</b>                       | Sets the frequency for each RF channel.                                        |
| <b>rf-channel ip-address mac-address udp-port</b> | Sets the IP address, MAC address and UDP port for each RF channel.             |

| Command                                       | Description                                       |
|-----------------------------------------------|---------------------------------------------------|
| <b>rf-channel network delay</b>               | Specifies the CIN delay for each RF channel.      |
| <b>rf-channel description</b>                 | Specifies the description for each RF channel.    |
| <b>rf-channel cable downstream channel-id</b> | Assigns a downstream channel ID to an RF channel. |

# ipdr associate

To associate the Collector with a session, use the **ipdr associate** command in global configuration mode. To remove the association, use the **no** form of this command.

**ipdr associate** *session\_id collector\_name priority*

**no ipdr associate** *session\_id collector\_name*

## Syntax

|                       |                                                                                                                                         |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <i>session_id</i>     | The unique IPDR session ID.                                                                                                             |
| <i>collector_name</i> | The collector name. The name should not contain extra spaces.                                                                           |
| <i>priority</i>       | The priority value between the session and the collector. The value range is 1 to 10. A value of 1 indicates that the highest priority. |

## Command Default

An association with the session will not be created.

## Command Modes

Global configuration mode

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

This command allows the user to associate the Collector with a session. Once the Collector is configured, the Exporter sends data to the Collector. IPDR supports redundant collector and consistent streaming continues when a collector is down or not functioning.

The **no** form of the command will only remove the association for the stopped session.



### Note

The collector and the session should be configured before running this command.

## Examples

The following example configures a Collector.

```
Router# configure terminal
Router(config)#ipdr associate 1 federal 1
```

## Related Commands

| Command                    | Description                                                                                                                   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>ipdr collector</b>      | Configures the IPDR Collector details.                                                                                        |
| <b>show ipdr collector</b> | Displays the collector information, message statistics and event for all the sessions that are associated with the collector. |
| <b>ipdr session</b>        | Adds a session to the IPDR Exporter.                                                                                          |

# ipdr collector

To configure the Internet Protocol Detail Record (IPDR) Collector details, use the **ipdr collector** command in global configuration mode. To remove the Collector, use the **no** form of this command.

**ipdr collector** *collector\_name* *ip\_addr* [*port*]

**no ipdr collector** *collector\_name*

| Syntax | Description           |                                                                                                              |
|--------|-----------------------|--------------------------------------------------------------------------------------------------------------|
|        | <i>collector_name</i> | The collector name. The name should not contain extra spaces.                                                |
|        | <i>ip_addr</i>        | The collector IP address.                                                                                    |
|        | <i>port</i>           | (Optional) The collector port value. The default port number will be considered if the value is not entered. |

**Command Default** A Collector will not be configured.

**Command Modes** Global configuration mode

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Usage Guidelines** This command allows the user to configure an IPDR Collector and authenticate the IPDR protocol. Once the Collector is configured, the Exporter sends data to the Collector. User must provide the collector name and the IP address. Port number is used when an exporter creates an active connection.

The **no** form of the command will remove a specific IPDR Collector. If the collector is associated with an active session, you should stop the session before using the **no** command.

**Examples** The following example configures a Collector.

```
Router# configure terminal
Router(config)#ipdr collector federal 192.0.2.0
```

| Related Commands | Command                    | Description                                                                                                                   |
|------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>show ipdr collector</b> | Displays the collector information, message statistics and event for all the sessions that are associated with the collector. |
|                  | <b>ipdr session</b>        | Adds a session to the IPDR Exporter.                                                                                          |

# ipdr exporter ack-timeout

To set IPDR Exporter acknowledged records timeout value, use the **ipdr exporter ack-timeout** command in global configuration mode. To disable the acknowledged records timeout value, use the **no** form of this command.

**ipdr exporter ack-timeout** *time\_interval*

**no ipdr exporter ack-timeout**

## Syntax Description

|                      |                                                                                                       |
|----------------------|-------------------------------------------------------------------------------------------------------|
| <i>time_interval</i> | Acknowledged records timeout count. The valid range is from 5 to 60 seconds. The default value is 60. |
|----------------------|-------------------------------------------------------------------------------------------------------|

## Command Default

This command is enabled when the IPDR Exporter is running.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.3(33)SCG | This command was introduced. |

## Usage Guidelines

This command allows you to set acknowledged records timeout value for a session.



### Note

Restart the IPDR Exporter for the timer values to take effect.

## Examples

The following example shows how to configure the acknowledged records timeout value on the Cisco CMTS router:

```
Router# configure terminal
Router(config)# ipdr exporter ack-timeout 60
Router(config)# ipdr exporter start
```

## Related Commands

| Command                   | Description                                                                  |
|---------------------------|------------------------------------------------------------------------------|
| <b>show ipdr exporter</b> | Displays information about the IPDR Exporter state on the Cisco CMTS router. |

# ipdr exporter keepalive

To set the keepalive timer value on the IPDR exporter, use the **ipdr exporter keepalive** command in global configuration mode. To disable the keepalive timer value, use the **no** form of this command.

**ipdr exporter keepalive** *time\_interval*

**no ipdr exporter keepalive**

| Syntax Description | <i>time_interval</i> | Keepalive timer count. The valid range is from 5 to 300 seconds. The default value is 300. |
|--------------------|----------------------|--------------------------------------------------------------------------------------------|
|--------------------|----------------------|--------------------------------------------------------------------------------------------|

| Command Default | This command is enabled when the IPDR Exporter is running. |
|-----------------|------------------------------------------------------------|
|-----------------|------------------------------------------------------------|

| Command Modes | Global configuration (config) |
|---------------|-------------------------------|
|---------------|-------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.3(33)SCG | This command was introduced. |

| Usage Guidelines | This command allows you to set the keepalive timeout value for a session. |
|------------------|---------------------------------------------------------------------------|
|------------------|---------------------------------------------------------------------------|

**Note**

Restart the IPDR Exporter for the keepalive timer values to take effect.

| Examples | The following example shows how to configure the keepalive value on the Cisco CMTS router: |
|----------|--------------------------------------------------------------------------------------------|
|----------|--------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# ipdr exporter keepalive 300
Router(config)# ipdr exporter start
```

| Related Commands | Command                   | Description                                                           |
|------------------|---------------------------|-----------------------------------------------------------------------|
|                  | <b>show ipdr exporter</b> | Displays information about the IPDR Exporter state on the Cisco CMTS. |

# ipdr exporter max-unacked

To set the maximum number of unacknowledged records on the IPDR exporter, on the Cisco CMTS, use the **ipdr exporter max unacked** command in global configuration mode. To reset the maximum number of unacknowledged records, use the **no** form of this command.

**ipdr exporter max-unacked** *records*

**no ipdr exporter max-unacked**

|                    |                |                                                                                                       |
|--------------------|----------------|-------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>records</i> | Number of unacknowledged records. The valid range is from 5 to 200 records. The default value is 200. |
|--------------------|----------------|-------------------------------------------------------------------------------------------------------|

|                 |                                                        |  |
|-----------------|--------------------------------------------------------|--|
| Command Default | This command is enabled when IPDR Exporter is running. |  |
|-----------------|--------------------------------------------------------|--|

|               |                               |  |
|---------------|-------------------------------|--|
| Command Modes | Global configuration (config) |  |
|---------------|-------------------------------|--|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.3(33)SCG | This command was introduced. |

|                  |                                                                                            |  |
|------------------|--------------------------------------------------------------------------------------------|--|
| Usage Guidelines | This command allows you to set the maximum number of unacknowledged records for a session. |  |
|------------------|--------------------------------------------------------------------------------------------|--|

  
Note

Restart the IPDR Exporter for the number of records to take effect.

|          |                                                                                                                                                                                                                                                       |  |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Examples | <p>The following example shows how to configure the number of unacknowledged records configured on the Cisco CMTS router:</p> <pre>Router# configure terminal Router(config)# ipdr exporter max-unacked 200 Router(config)# ipdr exporter start</pre> |  |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

| Related Commands | Command                   | Description                                                                  |
|------------------|---------------------------|------------------------------------------------------------------------------|
|                  | <b>show ipdr exporter</b> | Displays information about the IPDR Exporter state on the Cisco CMTS router. |



# ipdr exporter start

To enable the CMTS application, to start the Internet Protocol Detail Record (IPDR) Exporter process to connect the exporter and the collector, use the **ipdr exporter start** command in global configuration mode. To terminate the connection between the exporter and collector, use the **no** form of this command.

**ipdr exporter start**

**no ipdr exporter start**

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, the IPDR exporter process will not be started.

**Command Modes** Global configuration mode

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Usage Guidelines** This command allows the user to explicitly start the IPDR Exporter and connect to the collector. As a default behavior, the command will initiate all the sessions configured in the Exporter to a "Start" state. The **no** form of the command will stop the IPDR Exporter process. The command will also clear the connection with the collector while retaining other configurations.

**Examples** The following example starts the IPDR Exporter process on the CMTS.

```
Router# configure terminal
Router(config)#ipdr exporter start
```

| Related Commands | Command                    | Description                                                                                                                   |
|------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>show ipdr exporter</b>  | Displays information about the IPDR Exporter state.                                                                           |
|                  | <b>show ipdr collector</b> | Displays the collector information, message statistics and event for all the sessions that are associated with the collector. |
|                  | <b>ipdr collector</b>      | Configures the Internet Protocol Detail Record (IPDR) Collector details.                                                      |

# ipdr session

To start or stop a specific session, use the **ipdr session** command in the privileged EXEC mode.

```
ipdr session session_id {start | stop}
```

|                    |            |                                   |
|--------------------|------------|-----------------------------------|
| Syntax Description | session_id | The unique IPDR session ID.       |
|                    | start      | The keyword to start the session. |
|                    | stop       | The keyword to stop the session.  |

|                 |                          |
|-----------------|--------------------------|
| Command Default | No sessions are started. |
|-----------------|--------------------------|

|               |                      |
|---------------|----------------------|
| Command Modes | Privileged EXEC mode |
|---------------|----------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCB | This command was introduced. |

|                  |                                                                                                                                        |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command allows the user to start or stop a specific session. This command can be executed only when the IPDR exporter is started. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------|



|      |                                                                                         |
|------|-----------------------------------------------------------------------------------------|
| Note | The user has to stop the session before configuring any tasks if the session is active. |
|------|-----------------------------------------------------------------------------------------|

|          |                                                            |
|----------|------------------------------------------------------------|
| Examples | The following example enables the user to start a session. |
|----------|------------------------------------------------------------|

```
Router# configure terminal
Router(config)#ipdr session 1 start
```

|                  |                     |                                                         |
|------------------|---------------------|---------------------------------------------------------|
| Related Commands | Command             | Description                                             |
|                  | ipdr exporter start | Starts the IPDR Exporter and connects to the collector. |
|                  | show ipdr exporter  | Displays information about the IPDR Exporter state.     |
|                  | ipdr associate      | Associates the Collector with a session.                |

# ipdr session (global configuration)

To enable the CMTS application to add a session to the Internet Protocol Detail Record (IPDR) exporter, use the **ipdr session** command in global configuration mode. To remove the session, use the **no** form of this command.

**ipdr session** *session\_id session\_name session\_descr*

**no ipdr session** *session\_id*

## Syntax

|                      |                                                             |
|----------------------|-------------------------------------------------------------|
| <i>session_id</i>    | The unique IPDR session ID.                                 |
| <i>session_name</i>  | The session name. The name should not contain extra spaces. |
| <i>session_descr</i> | The description of the session.                             |

## Command Default

No sessions are added to the IPDR exporter. It depends on the status of the IPDR exporter. After configuring one session;if the status of exporter is started, then the session is started automatically.

## Command Modes

Global configuration mode

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

This command allows the user to add a session to the IPDR exporter. User should provide session ID, session name and session description for every session.

The **no** form of the command will remove a specific session. Once a session is removed, the template and other information associated with the session is also lost.



**Note** You can not update template details or other details when a session already created.

## Examples

The following example adds a session to the Exporter.

```
Router# configure terminal
Router(config)#ipdr session 1 test no_descr
```

## Related Commands

| Command                    | Description                                             |
|----------------------------|---------------------------------------------------------|
| <b>ipdr exporter start</b> | Starts the IPDR exporter and connects to the collector. |
| <b>show ipdr exporter</b>  | Displays information about the IPDR exporter state.     |
| <b>ipdr associate</b>      | Associates the IPDR collector with a session.           |

# ipdr template

To add an Internet Protocol Detail Record (IPDR) template to the IPDR session on the Cisco CMTS, use the **ipdr template** command in global configuration mode. To remove the template, use the **no** form of this command.

**ipdr template** *session\_id* *template\_name*

**no ipdr template** *session\_id* *template\_name*

## Syntax

|                      |                         |
|----------------------|-------------------------|
| <i>session_id</i>    | Unique IPDR Session ID. |
| <i>template_name</i> | Template name.          |

## Command Default

The IPDR template is not added to the IPDR session.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                      |
|-------------|-----------------------------------------------------------------------------------|
| 12.2(33)SCB | This command was introduced.                                                      |
| 12.2(33)SCG | A new template SERVICE-FLOW is added to the event-based and ad-hoc session types. |

## Usage Guidelines

This command allows the user to add an IPDR template to the desired session (based on session ID,) on the Cisco CMTS.



### Note

You can only add the system-supported templates. The list can be viewed by entering “?” at the command prompt.

## Examples

The following example displays the **show running-config** command output of the configured IPDR sessions and types:

```
Router(config)# do show running-config | i ipdr

ipdr session 1 test test
ipdr session 2 event2 event2
ipdr session 3 ad-hoc3 ad-hoc3
ipdr type 1 time-interval 15
ipdr type 2 event
ipdr type 3 event
```

The following example shows the templates available in a timer-interval session.

```
Router# ipdr template 1 ?
```

```
CM-STATUS DOCSIS-CMTS-CM-REG-STATUS-TYPE template
CM-US DOCSIS-CMTS-CM-US-STATS-TYPE template
DIAGLOG-DETAIL DOCSIS-DIAG-LOG-DETAIL-TYPE template
SAMIS-TYPE1 DOCSIS-SAMIS-TYPE-1 template
SAMIS-TYPE2 DOCSIS-SAMIS-TYPE-2 template
SPECTRUM DOCSIS-SPECTRUM-MEASUREMENT-TYPE template
TEST Template for test
```

The following example shows how to add the SAMIS\_TYPE1 template in a timer-interval session.

```
Router(config)# ipdr template 1 SAMIS-TYPE1
```

The following example shows how to view the templates available in an event-based session.

```
Router(config)# ipdr template 2 ?
```

```
CM-STATUS DOCSIS-CMTS-CM-REG-STATUS-TYPE template
CPE-TYPE DOCSIS-CPE-TYPE template
DIAGLOG-DETAIL DOCSIS-DIAG-LOG-DETAIL-TYPE template
DIAGLOG-EVENT DOCSIS-DIAG-LOG-EVENT-TYPE template
DS-UTIL DOCSIS-CMTS-DS-UTIL-STATS-TYPE template
SAMIS OSSI2.0 SAMIS template
SERVICE-FLOW SERVICE-FLOW-TYPE template
TEST Template for test
TOPOLOGY DOCSIS-CMTS-TOPOLOGY-TYPE template
US-UTIL DOCSIS-CMTS-US-UTIL-STATS-TYPE template
```

The following example shows how to view the templates available in an ad-hoc session.

```
Router(config)# ipdr template 3 ?
```

```
CM-STATUS DOCSIS-CMTS-CM-REG-STATUS-TYPE template
CPE-TYPE DOCSIS-CPE-TYPE template
DIAGLOG-DETAIL DOCSIS-DIAG-LOG-DETAIL-TYPE template
DIAGLOG-EVENT DOCSIS-DIAG-LOG-EVENT-TYPE template
DS-UTIL DOCSIS-CMTS-DS-UTIL-STATS-TYPE template
SAMIS OSSI2.0 SAMIS template
SERVICE-FLOW SERVICE-FLOW-TYPE template
TEST Template for test
TOPOLOGY DOCSIS-CMTS-TOPOLOGY-TYPE template
US-UTIL DOCSIS-CMTS-US-UTIL-STATS-TYPE template
```

## Related Commands

| Command                    | Description                                                               |
|----------------------------|---------------------------------------------------------------------------|
| <b>ipdr exporter start</b> | Starts the IPDR Exporter on the Cisco CMTS and connects to the collector. |
| <b>show ipdr exporter</b>  | Displays information about the IPDR Exporter state on the Cisco CMTS.     |
| <b>ipdr session</b>        | Adds a session to the IPDR Exporter on the Cisco CMTS.                    |

# ipdr type

To configure the IPDR session type, use the **ipdr type** command in global configuration mode. The IPDR session types that can be defined using this command are event type, time-interval type, and the ad hoc type.

Use the **no** form of the command to reset the session type to the default "event" type.

**ipdr type** *session\_id* [**ad-hoc** | **event** | **time-interval** *value*]

**no ipdr type** *session\_id*

## Syntax

|                                   |                                                                            |
|-----------------------------------|----------------------------------------------------------------------------|
| <i>session id</i>                 | IPDR session ID. Range is from 1 to 255.                                   |
| <b>ad-hoc</b>                     | The ad hoc session type.                                                   |
| <b>event</b>                      | The event session type.                                                    |
| <b>time-interval</b> <i>value</i> | The time-interval session type. Interval range is from 15 to 1440 minutes. |

## Command Default

The IPDR session type is not defined.

## Command Modes

Global configuration (config)

## Command History

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(33)SCD2 | This command was introduced. |

## Usage Guidelines

This command allows the user to define the specific IPDR session type.



### Note

Once the IPDR session type is configured, the templates supported by this IPDR type are automatically associated with it.

## Examples

The following example shows how to configure the IPDR “time-interval” session type for a time interval of 15 minutes.

```
Router> enable
Router# configure terminal
Router(config)# ipdr type 1 time-interval 15
```

## Related Commands

| Command                                          | Description                                                                 |
|--------------------------------------------------|-----------------------------------------------------------------------------|
| <b>cable ipdr<br/>cm-us-status interval</b>      | Displays a cable modem's upstream channel status information.               |
| <b>cable ipdr<br/>docs-spectrum<br/>interval</b> | Sets the interval between different spectrum measurements' data for a CMTS. |
| <b>cable ipdr diaglog<br/>interval</b>           | Sets the time interval between different diagnostic logs' data for a CMTS.  |
| <b>cable ipdr cm-status<br/>interval</b>         | Displays the CMTS and cable modem registration status information.          |

# issu linecard abortversion

To abort or roll back the current image version on a single line card or multiple line cards to the previous version, use the **issu linecard abortversion** command in the privileged EXEC mode.



Note

This command is used to abort or roll back the versions on redundant line cards only.

**issu linecard abortversion all** [*lc\_slot*[/*subslot*]] [**forced**]

## Syntax

|                |                                                                                                                                                                      |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>     | All redundant line cards.                                                                                                                                            |
| <i>lc_slot</i> | The line card slot number.                                                                                                                                           |
| <i>subslot</i> | The line card sub slot number.                                                                                                                                       |
| <b>forced</b>  | (Optional) The ISSU would ignore potential service outage and line card incompatibility errors and proceed with abortversion instead of stopping and error handling. |

## Command Default

No default behavior or values.

## Command Modes

Privileged EXEC mode

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

This command allows the user to roll back to prior image on working or primary line card on a single or multiple line cards to the previous versions.



Note

The **issu linecard reloadversion** command is used to reload a line card with the original version of images.

The following example aborts the specific redundant line card’s image version.

```
Router# configure terminal
Router(config)#issu linecard abortversion
```

## Related Commands

| Command                             | Description                                                                                                               |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>issu linecard acceptversion</b>  | Accepts the new image version on the working line card.                                                                   |
| <b>issu linecard loadversion</b>    | Loads a specific image version on the primary line card.                                                                  |
| <b>issu linecard prepareversion</b> | Determines if the image version on the line card has to be upgraded or downgraded to the route processor’s image version. |



| Command                            | Description                                                                                                  |
|------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>issu linecard reloadversion</b> | Reloads the new loaded image on a working or a primary line card.                                            |
| <b>issu linecard runversion</b>    | Runs the new loaded image on a working or a primary line card.                                               |
| <b>issu linecard changeversion</b> | Starts the upgrade or downgrade activity of the image version for a single line card or multiple line cards. |

# issu linecard acceptversion

To accept the new image version on the working line card, use the **issu linecard acceptversion** command in the privileged EXEC mode.

**issu linecard acceptversion** *lc\_slot*[/*subslot*]

|        |             |                |                                |
|--------|-------------|----------------|--------------------------------|
| Syntax | Description | <i>lc_slot</i> | The line card slot number.     |
|        |             | <i>subslot</i> | The line card sub slot number. |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC mode

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCB    | This command was introduced. |

**Usage Guidelines** This command allows the user to accept the new image version on the working line card. The command also indicates the completion of changing the image version for the specific line card and allows the ISSU of the next line card in the queue.

**Examples** The following example indicates a command accepting the image version on the slot 7 of the line card.

```
Router# configure terminal
Router(config)#issu linecard acceptversion 7/0
```

|                  |                                     |                                                                                                                           |
|------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Related Commands | <b>Command</b>                      | <b>Description</b>                                                                                                        |
|                  | <b>issu linecard abortversion</b>   | Rolls back to the prior image on working/primary line card.                                                               |
|                  | <b>issu linecard loadversion</b>    | Loads a specific image version on the primary line card.                                                                  |
|                  | <b>issu linecard prepareversion</b> | Determines if the image version on the line card has to be upgraded or downgraded to the route processor’s image version. |
|                  | <b>issu linecard reloadversion</b>  | Reloads the new loaded image on a working or a primary line card.                                                         |
|                  | <b>issu linecard runversion</b>     | Runs the new loaded image on a working or a primary line card.                                                            |
|                  | <b>issu linecard changeversion</b>  | Starts the upgrade or downgrade activity of the image version for a single line card or multiple line cards.              |

# issu linecard changeversion

To start the upgrade or downgrade activity of the image version for a single working line card or multiple working line cards, use the **issu linecard changeversion** command in the privileged EXEC mode.

**issu linecard changeversion {all | stop | slot\_1[/subslot\_1] ... [slot\_n[/subslot\_n]]} [forced]**

| Syntax           | Description                                                                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>       | All redundant line cards.                                                                                                                                             |
| <i>slot_1</i>    | The slot number for the first line card.                                                                                                                              |
| <i>subslot_1</i> | The sub slot number for the first line card.                                                                                                                          |
| <i>slot_n</i>    | The slot number for the n <sup>th</sup> line card.                                                                                                                    |
| <i>subslot_n</i> | The sub slot number for the n <sup>th</sup> line card.                                                                                                                |
| <b>forced</b>    | (Optional) The ISSU would ignore potential service outage and line card incompatibility errors and proceed with changeversion instead of stopping and error handling. |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC mode

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Usage Guidelines**

This command allows the user to start the upgrade or downgrade activity of the image version for a single line card or multiple line cards. Here the line cards are of the primary or working type only.

Using the **all** option, you can change the image version of all the redundant line cards instead of specifying explicitly each of the line card.

Using the **stop** option, you can abort or stop the version change process for a line card.

**Examples** The following example displays the command and uses the **all** option.

```
Router# configure terminal
Router(config)#issu linecard changeversion all
```

The following example displays the command and uses the slot value of 6.

```
Router# configure terminal
Router(config)#issu linecard changeversion 6/0
```

**Related Commands**

| Command                             | Description                                                                                                               |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>issu linecard abortversion</b>   | Rolls back to the prior image on working/primary line card.                                                               |
| <b>issu linecard acceptversion</b>  | Accepts the new image version on the working line card.                                                                   |
| <b>issu linecard loadversion</b>    | Loads a specific image version on the primary line card.                                                                  |
| <b>issu linecard prepareversion</b> | Determines if the image version on the line card has to be upgraded or downgraded to the route processor's image version. |
| <b>issu linecard reloadversion</b>  | Reloads the new loaded image on a working or a primary line card.                                                         |
| <b>issu linecard runversion</b>     | Runs the new loaded image on a working or a primary line card.                                                            |

# issu linecard loadversion

To load a specific image version on the primary line card, use the **issu linecard loadversion** command in the privileged EXEC mode.

**issu linecard loadversion** *slot*[/*subslot*]

| Syntax | Description    |                                |
|--------|----------------|--------------------------------|
|        |                |                                |
|        | <i>slot</i>    | The line card slot number.     |
|        | <i>subslot</i> | The line card sub slot number. |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC mode

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Usage Guidelines** This command allows the user to load a specific image version on the working line card.

**Examples** The following example shows the command that loads the image version on a line card with the slot number 7.

```
Router# configure terminal
Router(config)#issu linecard loadversion 7/0
```

| Related Commands | Command                             | Description                                                                                                               |
|------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|                  | <b>issu linecard abortversion</b>   | Rolls back to the prior image on working/primary line card.                                                               |
|                  | <b>issu linecard acceptversion</b>  | Accepts the new image version on the working line card.                                                                   |
|                  | <b>issu linecard prepareversion</b> | Determines if the image version on the line card has to be upgraded or downgraded to the route processor's image version. |
|                  | <b>issu linecard reloadversion</b>  | Reloads the new loaded image on a working or a primary line card.                                                         |
|                  | <b>issu linecard runversion</b>     | Runs the new loaded image on a working or a primary line card.                                                            |
|                  | <b>issu linecard changeversion</b>  | Starts the upgrade or downgrade activity of the image version for a single line card or multiple line cards.              |

# issu linecard prepareversion

To determine if the image version on the line card has to be upgraded or downgraded to the route processor's image version, use the **issu linecard prepareversion** command in the privileged EXEC mode.

```
issu linecard prepareversion lc_slot[/subslot] [forced]
```

|        |             |                                                                                                                                                                        |
|--------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax | Description |                                                                                                                                                                        |
|        | lc_slot     | The line card slot number.                                                                                                                                             |
|        | subslot     | The line card sub slot number.                                                                                                                                         |
|        | forced      | (Optional) The ISSU would ignore potential service outage and line card incompatibility errors and proceed with prepareversion instead of stopping and error handling. |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC mode

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Usage Guidelines**

This command allows the user to check if the image version on the line card has to be upgraded or downgraded to the route processor's image version.

This command also checks if the line card has a valid redundancy configuration. If the line card does not have a valid configuration, then the user has to reload the line card using the **issu linecard reloadversion** command.

**Examples**

The following example shows the command executed for a line card with a slot value of 7.

```
Router# configure terminal
Router(config)#issu linecard prepareversion 7/0
```

| Related Commands | Command                     | Description                                                       |
|------------------|-----------------------------|-------------------------------------------------------------------|
|                  | issu linecard abortversion  | Rolls back to the prior image on working/primary line card.       |
|                  | issu linecard acceptversion | Accepts the new image version on the working line card.           |
|                  | issu linecard loadversion   | Loads a specific image version on the primary line card.          |
|                  | issu linecard reloadversion | Reloads the new loaded image on a working or a primary line card. |

| Command                            | Description                                                                                                  |
|------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>issu linecard runversion</b>    | Runs the new loaded image on a working or a primary line card.                                               |
| <b>issu linecard changeversion</b> | Starts the upgrade or downgrade activity of the image version for a single line card or multiple line cards. |

# issu linecard process stop

To stop the automatic line card ISSU process, use the **issu linecard process stop** command in privileged EXEC mode.

## issu linecard process stop

**Syntax Description** This command has no arguments or keywords.

**Command Default** This command is enabled by default.

**Command Modes** Privileged EXEC mode

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |
|                 | 12.2(33)SCG | This command is obsolete.    |

**Usage Guidelines** Use the **issu linecard process stop** command to interrupt the automatic ISSU process continuing to the next line card.

Starting Cisco IOS Release 12,2(33)SCG and later, **issu linecard process stop** is no longer supported on the Cisco CMTS router.

**Associated Features** The **issu linecard process stop** command is associated with following features:

- [Cisco IOS In Service Software Upgrade Process](#)

**Examples** The following example shows how to stop the ISSU process:

```
Router> enable
Router# issu linecard process stop
```

| Related Commands | Command                             | Description                                                                                                               |
|------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|                  | <b>issu linecard abortversion</b>   | Rolls back to the prior image on working/primary line card.                                                               |
|                  | <b>issu linecard acceptversion</b>  | Accepts the new image version on the working line card.                                                                   |
|                  | <b>issu linecard loadversion</b>    | Loads a specific image version on the primary line card.                                                                  |
|                  | <b>issu linecard prepareversion</b> | Determines if the image version on the line card has to be upgraded or downgraded to the route processor's image version. |



| Command                            | Description                                                                                                  |
|------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>issu linecard reloadversion</b> | Reloads the new loaded image on a working or a primary line card.                                            |
| <b>issu linecard runversion</b>    | Runs the new loaded image on a working or a primary line card.                                               |
| <b>issu linecard changeversion</b> | Starts the upgrade or downgrade activity of the image version for a single line card or multiple line cards. |

# issu linecard reloadversion

To reload the new loaded image on a working or a primary line card, use the **issu linecard reloadversion** command in the privileged EXEC mode.

```
issu linecard reloadversion {original | target} all | slot_1[/subslot_1] ... [slot_n[/subslot_n]]
```

|                    |                  |                                                        |
|--------------------|------------------|--------------------------------------------------------|
| Syntax Description | <b>original</b>  | The original image version.                            |
|                    | <b>all</b>       | All redundant line cards.                              |
|                    | <i>slot_1</i>    | The slot number for the first line card.               |
|                    | <i>subslot_1</i> | The sub slot number for the first line card.           |
|                    | <i>slot_n</i>    | The slot number for the n <sup>th</sup> line card.     |
|                    | <i>subslot_n</i> | The sub slot number for the n <sup>th</sup> line card. |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC mode

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCB    | This command was introduced. |

**Usage Guidelines**

This command allows the user to reload the new loaded image on a working or a primary line card. This command can be used for the following line card conditions.

- Line cards that are not configured with redundancy, and do not support Minimal Disruptive Restart (MDR.)
- Line cards which are capable of line card redundancy which were rolled back due to an unsuccessful changeversion command.

**Examples** The following example shows the command executed with the **original** keyword.

```
Router# configure terminal
Router(config)#issu linecard reloadversion original 8/0
```

The following example shows the command executed with the **target** keyword.

```
Router# configure terminal
Router(config)#issu linecard reloadversion target 8/0
```

**Related Commands**

| Command                             | Description                                                                                                               |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>issu linecard abortversion</b>   | Rolls back to the prior image on working or primary line card.                                                            |
| <b>issu linecard acceptversion</b>  | Accepts the new image version on the working line card.                                                                   |
| <b>issu linecard loadversion</b>    | Loads a specific image version on the primary line card.                                                                  |
| <b>issu linecard prepareversion</b> | Determines if the image version on the line card has to be upgraded or downgraded to the route processor's image version. |
| <b>issu linecard runversion</b>     | Runs the new loaded image on a working or a primary line card.                                                            |
| <b>issu linecard changeversion</b>  | Starts the upgrade or downgrade activity of the image version for a single linecard or multiple line cards.               |

# issu linecard runversion

To run the new loaded image on a working or a primary line card, use the **issu linecard runversion** command in the privileged EXEC mode.

**issu linecard runversion** *lc\_slot*[/*subslot*] [**forced**]

|                    |                |                                                                                                                                                                    |
|--------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>lc_slot</i> | The line card slot number.                                                                                                                                         |
|                    | <i>subslot</i> | The line card sub slot number.                                                                                                                                     |
|                    | <b>forced</b>  | (Optional) The ISSU would ignore potential service outage and line card incompatibility errors and proceed with runversion instead of stopping and error handling. |
|                    |                |                                                                                                                                                                    |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC mode

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCB    | This command was introduced. |

**Usage Guidelines** This command allows the user to run the new loaded image on a working or a primary line card.

**Examples** The following example displays the command executed to run the loaded image in the line card slot 7.

```
Router# configure terminal
Router(config)#issu linecard runversion 7/0
```

|                  |                                     |                                                                                                                           |
|------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Related Commands | <b>Command</b>                      | <b>Description</b>                                                                                                        |
|                  | <b>issu linecard abortversion</b>   | Rolls back to the prior image on the working/primary line card.                                                           |
|                  | <b>issu linecard acceptversion</b>  | Accepts the new image version on the working line card.                                                                   |
|                  | <b>issu linecard loadversion</b>    | Loads a specific image version on the primary line card.                                                                  |
|                  | <b>issu linecard prepareversion</b> | Determines if the image version on the line card has to be upgraded or downgraded to the route processor's image version. |
|                  | <b>issu linecard reloadversion</b>  | Reloads the new loaded image on a working or a primary line card.                                                         |
|                  | <b>issu linecard changeversion</b>  | Starts the upgrade or downgrade activity of the image version for a single linecard or multiple line cards.               |

# license feature evaluation disable

To disable an evaluation license for Cisco uBR-MC3GX60V and Cisco UBR-MC20X20V cable interface line cards on the Cisco uBR10012 router, use the **license feature evaluation disable** command in global configuration mode.

**license feature evaluation disable** {DS\_License | US\_License | all} **subslot** *slot/subslot*

| Syntax Description                 |  |                                                                                                                                                                                                                                         |
|------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>disable</b>                     |  | Disables an evaluation license for a cable interface line card.                                                                                                                                                                         |
| <b>DS_License</b>                  |  | Disables a downstream evaluation license for a cable interface line card.                                                                                                                                                               |
| <b>US_License</b>                  |  | Disables an upstream evaluation license for a cable interface line card.                                                                                                                                                                |
| <b>all</b>                         |  | Disables both downstream and upstream evaluation licenses for a cable interface line card.                                                                                                                                              |
| <b>subslot</b> <i>slot/subslot</i> |  | <ul style="list-style-type: none"><li><i>slot</i>—Slot where the line card resides. The valid range is from 5 to 8.</li><li><i>subslot</i>—Secondary slot number of the cable interface line card. The valid value is 0 or 1.</li></ul> |

|                        |                                                                        |
|------------------------|------------------------------------------------------------------------|
| <b>Command Default</b> | A cable interface line card evaluation license is disabled by default. |
|------------------------|------------------------------------------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

|                         |                                                                                                                                                                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Evaluation licenses are temporary and used to evaluate a feature set on a new line card. Ensure that an equivalent permanent license is installed on the Cisco CMTS before the evaluation license expires to avoid any service disruptions. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

To obtain evaluation licenses from the Cisco licensing portal, go to:  
<https://tools.cisco.com/SWIFT/Licensing/PrivateRegistrationServlet?DemoKeys=Y>

|                 |                                                                                                                                                           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to disable both downstream and upstream evaluation licenses for a cable interface line card on the Cisco uBR10012 router: |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# license feature evaluation disable all subslot 5/0
```

The following example shows how to disable a downstream evaluation license for a cable interface line card on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# license feature evaluation disable DS_License subslot 6/0
```

The following example shows how to disable an upstream evaluation license for a cable interface line card on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# license feature evaluation disable US_License subslot 6/1
```

| Related Commands | Command                           | Description                                                                                             |
|------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------|
|                  | license feature evaluation enable | Enables an evaluation license for Cisco uBR-MC3GX60V and Cisco UBR-MC20X20V cable interface line cards. |

# license feature evaluation enable

To enable an evaluation license for Cisco uBR-MC3GX60V and Cisco UBR-MC20X20V cable interface line cards on the Cisco uBR10012 router, use the **license feature evaluation enable** command in global configuration mode.

**license feature evaluation enable** { **DS\_License** | **US\_License** | **all** } **subslot** *slot/subslot*

| Syntax Description                 |  |                                                                                                                                                                                                                                                         |
|------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>enable</b>                      |  | Enables an evaluation license for a cable interface line card.                                                                                                                                                                                          |
| <b>DS_License</b>                  |  | Enables a downstream evaluation license for a cable interface line card.                                                                                                                                                                                |
| <b>US_License</b>                  |  | Enables an upstream evaluation license for a cable interface line card.                                                                                                                                                                                 |
| <b>all</b>                         |  | Enables both downstream and upstream evaluation licenses for a cable interface line card.                                                                                                                                                               |
| <b>subslot</b> <i>slot/subslot</i> |  | <ul style="list-style-type: none"><li><i>slot</i>—Slot where the cable interface line card resides. The valid range is from 5 to 8.</li><li><i>subslot</i>—Secondary slot number of the cable interface line card. The valid value is 0 or 1.</li></ul> |

|                        |                                                                           |
|------------------------|---------------------------------------------------------------------------|
| <b>Command Default</b> | A cable interface line card evaluation license is not enabled by default. |
|------------------------|---------------------------------------------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                    |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Evaluation licenses are temporary and used to evaluate a feature set on a new cable interface line card. Ensure that an equivalent permanent license is installed on the Cisco CMTS router before the evaluation license expires to avoid any service disruptions. |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

To obtain evaluation licenses from the Cisco licensing portal, go to:  
<https://tools.cisco.com/SWIFT/Licensing/PrivateRegistrationServlet?DemoKeys=Y>

|                 |                                                                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable both downstream and upstream evaluation licenses for a cable interface line card on the Cisco uBR10012 router: |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# license feature evaluation enable all subslot 5/0
```

The following example shows how to enable a downstream evaluation license for a cable interface line card on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# license feature evaluation enable DS_License subslot 6/0
```

The following example shows how to enable an upstream evaluation license for a cable interface line card on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# license feature evaluation enable US_License subslot 6/1
```

| Related Commands | Command                            | Description                                                                                              |
|------------------|------------------------------------|----------------------------------------------------------------------------------------------------------|
|                  | license feature evaluation disable | Disables an evaluation license for Cisco uBR-MC3GX60V and Cisco UBR-MC20X20V cable interface line cards. |



# logging cmts sea

To enable the logging of syslog messages to System Event Archive (SEA), use the **logging cmts sea** command from global configuration mode. To disable logging of syslog messages to SEA, use the **no** form of the command.

**logging cmts sea** [syslog-level *level*]

**no logging cmts sea**

## Syntax Description

|                                  |                                                                                                                                                                                                                                  |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>syslog-level</b> <i>level</i> | (Optional) Configures the level of syslog messages inclusive of and above the specified level which will be stored in the SEA log file.                                                                                          |
| Possible values for level are:   | Emergency security level indicates system is unusable. The default severity level for emergency syslog messages is 0.                                                                                                            |
| <i>level=emergencies</i>         |                                                                                                                                                                                                                                  |
| <i>level=alerts</i>              | Alerts severity level indicates that immediate action is needed. The default severity level for alerts syslog messages is 1.                                                                                                     |
| <i>level=critical</i>            | Critical severity level indicates the critical condition of the system. The default severity level for critical syslog messages is 2.                                                                                            |
| <i>level=errors</i>              | Errors severity level indicates the error conditions. The default severity level for errors syslog messages is 3.                                                                                                                |
| <i>level=warnings</i>            | Warning severity level warns the network administrator. The severity level for warning syslog messages is 4.                                                                                                                     |
| <i>level=notifications</i>       | Notification severity level indicates normal but significant condition of the system. By default severity level for syslog messages is configured as 'normal'. The default severity level for notification syslog messages is 5. |
| <i>level=informational</i>       | Informational severity level provides additional information about the system. The default severity level for informational syslog messages is 6.                                                                                |
| <i>level=debugging</i>           | Debugging severity level provides debugging messages. The default severity level for debugging syslog messages is 7.                                                                                                             |

## Command Default

By default, storing of syslog messages to SEA log file is enabled, with the severity-level of syslog messages being set to 'notification'.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

Use the **logging cmts sea** command is used to enable the logging of syslog messages to SEA log file. To change the severity-level of syslog messages inclusive of and above the level to be stored in SEA log file, specify the command **logging cmts sea** [syslog-level *level*].

Examples

The following example shows how to enable logging of syslog messages to SEA log file on the Cisco uBR10012 router:

```
Router(config)# logging cmts sea
```

The following example shows how to disable logging of syslog messages to SEA log file on the Cisco uBR10012 router:

```
Router(config)# no logging cmts sea
```

The following example shows how to change the severity-level of syslog messages inclusive of and above the level being stored in the SEA log file:

```
Router(config)# logging cmts sea syslog-level warning
```

Related Commands

|                      |                                                        |
|----------------------|--------------------------------------------------------|
| clear logging system | Clears the event records stored in the SEA.            |
| copy logging system  | Copies the archived system events to another location. |
| logging system       | Enables or disables the SEA logging system.            |

# mac-address

To modify the default MAC address of an interface to some user-defined address, use the **mac-address** command in interface configuration mode. To return to the default MAC address on the interface, use the **no** form of this command.

**mac-address** *ieee-address*

**no mac-address** *ieee-address*

## Syntax Description

|                     |                                                                                       |
|---------------------|---------------------------------------------------------------------------------------|
| <i>ieee-address</i> | 48-bit IEEE MAC address written as a dotted triple of four-digit hexadecimal numbers. |
|---------------------|---------------------------------------------------------------------------------------|

## Defaults

The interface uses a default MAC address that is derived from the base address stored in the electrically erasable programmable read-only memory (EEPROM).

## Command Modes

Interface configuration

## Usage Guidelines

Be sure that no other interface on the network is using the MAC address that you assign.

There is a known defect in earlier forms of this command when the Texas Instruments Token Ring MAC firmware is used. This implementation is used by Proteon, Apollo, and IBM RTs. A host using a MAC address whose first two bytes are zeros (such as a Cisco router) will not properly communicate with hosts using that form of this command of TI firmware.

There are two solutions. The first involves installing a static Routing Information Field (RIF) entry for every faulty node with which the router communicates. If there are many such nodes on the ring, this may not be practical. The second solution involves setting the MAC address of the Cisco Token Ring to a value that works around the problem.

This command forces the use of a different MAC address on the specified interface, thereby avoiding the Texas Instrument MAC firmware problem. It is up to the network administrator to ensure that no other host on the network is using that MAC address.

## Examples

The following example sets the MAC layer address, where *xx.xxxx* is an appropriate second half of the MAC address to use:

```
interface tokenring 0
 mac-address 5000.5axx.xxxx
```

The following example changes the default MAC address on the interface to 1111.2222.3333:

```
Router# configure terminal
Router(config)# interface fastethernet 2/1/1
Router(config-if)# mac-address 1111.2222.3333
```

## Related Commands

| Command                                | Description                                                 |
|----------------------------------------|-------------------------------------------------------------|
| <b>show interfaces fastethernet</b>    | Displays information about the Fast Ethernet interfaces.    |
| <b>show interfaces gigabitethernet</b> | Displays information about the Gigabit Ethernet interfaces. |

# main-cpu

To enter main-CPU redundancy configuration mode, so that you can configure the synchronization of the active and standby Performance Routing Engine (PRE1) modules, use the **main-cpu** command in redundancy configuration mode.

## main-cpu

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no keywords or arguments. |
|---------------------------|--------------------------------------------|

|                 |                               |
|-----------------|-------------------------------|
| <b>Defaults</b> | No default behavior or values |
|-----------------|-------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| <b>Command Modes</b> | Redundancy configuration (config-r) |
|----------------------|-------------------------------------|

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.2(4)XF   | This command was introduced for the Cisco uBR10012 router.      |
|                 | 12.2(11)BC3 | Support for the <b>switchover timeout</b> command was added.    |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.      |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

|                         |                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | When you enter main-CPU redundancy configuration mode, the prompt changes to the following: |
|-------------------------|---------------------------------------------------------------------------------------------|

```
Router(config-r-mc)#
```

After you enter main-CPU redundancy configuration mode, you can use the **auto-sync** command to specify which files are synchronized between the active and standby PRE1 modules. In Cisco IOS Release 12.2(11)BC3 and later releases, you can also use the **switchover timeout** command to specify the amount of time that the standby PRE1 module should wait when it first detects that the active PRE1 module is not active and when it initiates a switchover and becomes the active PRE1 module.

To leave main-CPU redundancy configuration mode and to return to redundancy configuration mode, use the **exit** command.

|                 |                                                                                                              |
|-----------------|--------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enter main-CPU redundancy mode and the commands that are available there: |
|-----------------|--------------------------------------------------------------------------------------------------------------|

```
Router# config t
Router(config)# redundancy
Router(config-r)# main-cpu
Router(config-r-mc)# ?
```

Main Cpu redundancy configuration commands:

|            |                                       |
|------------|---------------------------------------|
| auto-sync  | Sync elements                         |
| exit       | Exit from main-cpu configuration mode |
| no         | Negate a command or set its defaults  |
| switchover | Configuration of switchover           |

```
Router(config-r-mc) #
```

**Related Commands**

| Command                   | Description                                                                          |
|---------------------------|--------------------------------------------------------------------------------------|
| <b>associate slot</b>     | Logically associate slots for APS processor redundancy                               |
| <b>auto-sync</b>          | Configures which files are synchronized between the active and standby PRE1 modules. |
| <b>redundancy</b>         | Enters redundancy configuration mode.                                                |
| <b>switchover timeout</b> | Configures the switchover timeout period of the PRE1 module.                         |

# maintenance-mode

To configure the PRE1 modules on the router for maintenance mode, use the **maintenance-mode** command in redundancy configuration mode. To return to normal operations, use the **no** form of this command.

**maintenance-mode**

**no maintenance-mode**

**Syntax Description** This command has no keywords or arguments.

**Command Default** Normal operations (**no maintenance-mode**)

**Command Modes** Redundancy configuration

| Command History | Release   | Modification                                               |
|-----------------|-----------|------------------------------------------------------------|
|                 | 12.2(4)XF | This command was introduced for the Cisco uBR10012 router. |

**Usage Guidelines** When the Cisco uBR10012 router is configured with redundant PRE1 modules, the active PRE1 module automatically synchronizes the configuration, network state information, and other information with the standby PRE1 module, so that if a switchover occurs, the standby module can restore normal operations quickly. You can use the **maintenance-mode** command to disable this automatic synchronization of the PRE1 modules, and to disable the reporting of any faults on the standby module to the active module.



**Note**

The **maintenance-mode** command disables the ability of the Cisco uBR10012 router to switchover PRE1 modules and should be used only while upgrading the router or troubleshooting network problems.

**Examples** The following example shows how to disable the automatic PRE1 module synchronization on the Cisco uBR10012 router and enter maintenance mode:

```
Router# config t
Router(config)# redundancy
Router(config-r)# maintenance-mode
Router(config-r)# exit
Router(config)#
```

The following example shows how to leave maintenance mode and return to normal operations, which includes the automatic synchronization of the PRE1 modules:

```
Router# config t
Router(config)# redundancy
Router(config-r)# no maintenance-mode
Router(config-r)# exit
Router(config)#
```

| Related Commands | Command           | Description                                                                          |
|------------------|-------------------|--------------------------------------------------------------------------------------|
|                  | <b>auto-sync</b>  | Configures which files are synchronized between the active and standby PRE1 modules. |
|                  | <b>redundancy</b> | Enters redundancy configuration mode.                                                |



# match rule

To configure the match rule, rule priority and related action in the selected cable multicast authorization profile, use the **match rule** command in interface configuration mode. To disable a cable multicast authorization profile match, use the **no** form of this command.

**match rule** [*ipv4* | *ipv6*] [*source-prefix*] [*group-prefix*] **priority** [*priority-value*] [*permit* | *deny*]

**no match rule** [*ipv4/ipv6*] [*source-prefix*] [*group-prefix*] **priority** [*priority-value*] [*permit/deny*]

## Syntax Description

**match rule** [*ipv4* | *ipv6*] Specifies the matching source rule.



### Note

Though CLI allows IPv6 to be configured, only IPv4 is supported in the CMTS.

*source-prefix* (Optional) Specifies the matching source address prefix.

Example: 223.1.1.1/16

*group-prefix* (Optional) Specifies the matching group address prefix.

Example: 223.1.1.1/16

**priority** Specifies the priority of the cable multicast authorization profile.

[*priority-value*]

Priority value range is: 0-255.

*permit* The argument *permit* allows specified packets to be forwarded.

*deny* The argument *deny* allows to specified packets to be rejected.

## Command Default

Cable multicast authorization is disabled.

## Command Modes

Interface configuration—cable interface only (config-mauth)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

This command specifies the cable multicast authorization profile match to be used.

## Examples

The following example shows how to use the selected multicast authorization profile match:

```
Router(config-mauth)# match rule rule1
```

| Related Commands | Command                                                    | Description                                                                                                                                                              |
|------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable multicast authorization enable default-action</b> | This command enables the cable multicast authorization features. If the multicast authorization feature is disabled, all defined authorization profiles are ineffective. |
|                  | <b>cable multicast authorization profile-name</b>          | Defines the cable multicast authorization profile.                                                                                                                       |
|                  | <b>show cable multicast authorization</b>                  | Displays the list of defined multicast authorization profiles and all CMs associated with corresponding profiles.                                                        |

# member subslot

To configure the redundancy role of a line card, use the **member subslot** command in line card redundancy group mode.

```
member subslot slot/subslot {primary | secondary}
```

```
no member subslot slot/subslot {primary | secondary}
```

## Cisco uBR10012 Universal Broadband Routers

```
member subslot slot/subslot {protect [config slot/subslot | rf-power [rf-connector
rfconnector-value] {hccp-delta diff-pwr | hccp-override override-pwr}] | working [rfsw-slot
slot-value] | revertive | revertime value}
```

```
no member subslot slot/subslot {protect [config slot/subslot | rf-power [rf-connector
rfconnector-value] {hccp-delta diff-pwr | hccp-override override-pwr}] | working [rfsw-slot
slot-value] | revertive | revertime value}
```

### Syntax Description

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                           | Slot number of the line card in the chassis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>subslot</i>                        | Slot number of the line card in the chassis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>primary</b>   <b>secondary</b>     | Configures the redundancy role of the line card. <ul style="list-style-type: none"> <li><b>primary</b>—Active line card.</li> <li><b>secondary</b>—Standby line card.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>protect</b>                        | Specifies the protect slot in the line card group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>config</b> slot/subslot            | (Optional) Specifies the appropriate working interface configuration that is used for the protect interface when a switchover occurs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>rf-power</b>                       | (Optional) Specifies the RF power output level on an integrated upconverter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>rf-connector</b> rfconnector-value | (Optional) Specifies the RF connector in the protect line card. The default value is <i>all</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>hccp-delta</b> diff-pwr            | When using N+1 Hotstandby Connection-to-Connection Protocol (HCCP) redundancy, the protect interface adds the <i>diff-pwr</i> value to the current power value of the working interface when a switchover occurs. This allows the router to accommodate relative differences between the RF power levels in working and protect interfaces. The valid value for <i>diff-pwr</i> ranges from –12 to +12 dBmV.                                                                                                                                                                                                                      |
| <b>hccp-override</b> override-pwr     | When using N+1 HCCP redundancy, the protect interface uses the override power value instead of the power value of the working interface when a switchover occurs. This allows the router to accommodate absolute differences between the RF power levels in working and protect interfaces. The valid value for <i>override-pwr</i> ranges from 45 to 63 dBmV. <p><b>Note</b> The official range for acceptable power levels in the DOCSIS specification is 50 to 61 dBmV. Cisco cable interfaces exceed the DOCSIS standard, but power levels outside the DOCSIS standards should be used only in lab and test environments.</p> |
| <b>working</b>                        | Specifies the working slot in the line card group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>rfsw-slot</b> slot-value           | (Optional) Specifies the RF switch slot for the working line card.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                                |                                                                                                                                                                                       |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>revertive</b>               | Specifies the revert operation on the protect card.                                                                                                                                   |
| <b>reverttime</b> <i>value</i> | Specifies the time interval for the revert operation in minutes. If you specify the time interval as 30 minutes, the protect card switches back to the protect mode after 30 minutes. |

**Command Default** None

**Command Modes** Line card redundancy group

| Command History | Release      | Modification                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(28)SB   | This command was introduced for the Cisco 10000 series routers.                                                                                                                                                                                                                                                                                                                                    |
|                 | 12.3(23)BC   | This command was integrated into Cisco IOS Release 12.3(23)BC.                                                                                                                                                                                                                                                                                                                                     |
|                 | 12.2(33)SCA  | Support for the following keywords was removed in Cisco IOS Release 12.2(33)SCA and later releases: <ul style="list-style-type: none"> <li>• <b>revertive</b></li> <li>• <b>reverttime</b></li> </ul> <p><b>Note</b> Use the <b>revertive</b> command in line card redundancy group mode to enable the revert operation on a protect card in Cisco IOS Release 12.2(33)SCA and later releases.</p> |
|                 | 12.2(33)SCC4 | Support for the following keywords was added in Cisco IOS Release 12.2(33)SCC4 for Cisco uBR10012 routers: <ul style="list-style-type: none"> <li>• <b>rf-power</b></li> <li>• <b>rf-connector</b></li> <li>• <b>hccp-delta</b></li> <li>• <b>hccp-override</b></li> </ul>                                                                                                                         |
|                 | 12.2(33)SCE  | The <b>config</b> option of the command was made the default. When more than one working line cards are configured, the config option is automatically applied to the first working card.                                                                                                                                                                                                          |

**Usage Guidelines** The primary line card must be the first line card configured and must occupy subslot 1. The secondary line card must be the second line card configured and must occupy subslot 0. Only one primary line card and one secondary line card can be configured.



**Note**

Configuration changes to the working line card cause the upstream links on the protect line card to flap. This is applicable only to Cisco uBR10012 routers.

**Examples** The following example shows how to create a line card group number 1 for one-to-one line card redundancy. It also specifies the line card in subslot 1 as the primary (active) line card, and the line card in subslot 0 as the secondary (standby) line card.

```

Router# configure terminal
Router(config)# redundancy
Router(config-red)# linecard-group 1 y-cable
Router(config-red-lc)# member subslot 2/1 primary
Router(config-red-lc)# member subslot 2/0 secondary

```

**Note**

The rest of the examples listed here are only applicable to Cisco uBR10012 routers.

The following example shows how to configure a protect interface to add 3 dBmV to the current working RF power level when a switchover occurs:

```

Router# configure terminal
Router(config)# redundancy
Router(config-red)# linecard-group 1 cable
Router(config-red-lc)# member subslot 5/1 protect rf-power hccp-delta 3

```

The following example shows how to configure a protect interface to use an RF power level of 48 dBmV instead of the current working RF power level when a switchover occurs:

```

Router# configure terminal
Router(config)# redundancy
Router(config-red)# linecard-group 1 cable
Router(config-red-lc)# member subslot 5/1 protect rf-power hccp-override 48

```

The following example shows how to configure a rf-connector 3 on a protect interface to add 5 dBmV to the current working RF power level when a switchover occurs:

```

Router# configure terminal
Router(config)# redundancy
Router(config-red)# linecard-group 1 cable
Router(config-red-lc)# member subslot 5/1 protect rf-power rf-connector 3 hccp-delta 5

```

**Related Commands**

| Command                         | Description                                                          |
|---------------------------------|----------------------------------------------------------------------|
| <b>linecard-group</b>           | Creates a line card group for one-to-one line card redundancy.       |
| <b>redundancy</b>               | Enters redundancy mode.                                              |
| <b>show redundancy linecard</b> | Displays information about a redundant line card or line card group. |

# method

To select the method the CMTS uses to determine the load, use the **method** command in the config-lb-group configuration mode. To reset the method, use the **no** form of this command.

**method {modems | service-flows | utilization} {us-method {modems | service-flows | utilization}}**

**no method**

|                    |                                                         |                                                                                                          |
|--------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>modems</b>                                           | Specifies the load balancing method for the number of modems on the CMTS.                                |
|                    | <b>service-flows</b>                                    | Specifies the load balancing method for the number of service flows on the CMTS.                         |
|                    | <b>utilization</b>                                      | Specifies the load balancing method for the interface utilization on the CMTS.                           |
|                    | <b>us-method {modems   service-flows   utilization}</b> | Specifies the load balancing method for upstream (US) channels on modems, service-flows, or utilization. |

**Command Default** No default behavior or values.

**Command Modes** DOCSIS load balancing group mode (config-lb-group)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCC    | This command was introduced. |

**Usage Guidelines** The upstream channel uses the same method as the downstream channel. Change the method of the upstream channel using the **method** command.

**Examples** The following example shows how to select the method the CMTS uses to determine the load, using the **method** command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# method modems us-method service-flows
Router(config-lb-group)#
```

## Related Commands

| Command                                             | Description                                                                                                             |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance<br/>docsis-group</b>          | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
| <b>show cable<br/>load-balance<br/>docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |

# microcode (uBR10012)

To reload the microcode software images on a Parallel eXpress Forwarding (PXF) processor or on all line cards that support downloadable microcode, use the **microcode** command in global configuration mode.

**microcode** {*pxf filename* | **reload**}

|                    |                 |                                                                                                                      |
|--------------------|-----------------|----------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>pxf</b>      | Reloads the microcode for the PXF processors on the Performance Routing Engine (PRE1) module.                        |
|                    | <i>filename</i> | Specifies the microcode software image for the PXF processors by device name and filename.                           |
|                    | <b>reload</b>   | Reloads the microcode for all PRE1 modules and other line cards that support downloadable microcode software images. |

**Command Default** No default behavior or values

**Command Modes** Global configuration

|                 |                |                                                            |
|-----------------|----------------|------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                        |
|                 | 12.2(1)XF1     | This command was introduced for the Cisco uBR10012 router. |

**Usage Guidelines**

By default, the Cisco uBR10012 router automatically loads all required microcode on to the PXF processors and other line cards when it loads the Cisco IOS software image. Also, the PRE1 module automatically reloads the microcode on a card when certain faults occur, allowing the card to recover from the fault.

You can reload the microcode on the PRE1 module or on all line cards that support downloadable microcode by using the **microcode** command. Typically, this is not needed and should be done only upon the advice of Cisco TAC or field service engineers.



**Tip** You can also reload the microcode on the PXF processors or on all cards using the **microcode reload** command in privileged EXEC mode. In particular, use the **microcode reload** command to reload the PXF processors with the default microcode that was loaded along with the Cisco IOS software image.

**Examples**

The following example shows how to reload the microcode on all PRE processors and line cards that support downloadable microcode:

```
Router# configure terminal
Router(config)# microcode reload
Reload microcode? [confirm] yes

00:49:41: Downloading Microcode: file=system:pxf/ubr10k-ucode.1.2.3,
```



```
version=1.1.0, description=Release Software created Wed 17-Jul-02 16:58
```

```
<<list of interfaces going down or coming up>>
```

```
00:49:42: !!pxf clients started, forwarding code operational!!
```

```
Router(config)#
```

The following example shows how to reload the microcode on the PXF processors on the PRE1 module, using a specific image that is stored in the Flash memory:

```
Router# configure terminal
```

```
Router(config)# microcode pxf flash:pxf/ubr10k-ucode.122.1.2.3
```

```
Reload microcode? [confirm] yes
```

```
1d04h: Downloading Microcode: file=flash:pxf/ubr10k-ucode.122.1.2.3, version=122.1.2.3,
description=Release Software created Thu 17-Oct-02 11:33
```

```
<<list of interfaces going down or coming up>>
```

```
1d04h: !!pxf clients started, forwarding code operational!!
```

```
Router(config)#
```

#### Related Commands

| Command                   | Description                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------|
| <b>hw-module reset</b>    | Resets a particular PRE1 module or a particular line card.                                          |
| <b>microcode reload</b>   | Reloads the microcode software images on one or all line cards that support downloadable microcode. |
| <b>show pxf microcode</b> | Displays display identifying information for the microcode being used on the PXF processors.        |

# microcode reload (uBR10012)

To reload the microcode software images on one or all line cards that support downloadable microcode, use the **microcode reload** command in privileged EXEC mode.

```
microcode reload {all | pxf [device:[filename]]}
```

Syntax Description

|                   |                                                                                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| all               | Reloads the microcode for all Performance Routing Engine (PRE1) modules and other line cards that support downloadable microcode software images.                                                                   |
| pxf               | Reloads the microcode for the Parallel eXpress Forwarding (PXF) processors on the PRE1 module.                                                                                                                      |
| device:[filename] | (Optional) Loads the PXF processors with the microcode software image that has the specific filename on the specific device. If no filename is specified, the first image found on the device is loaded by default. |

Command Default

For **microcode reload pxf**, defaults to loading the microcode image that was originally loaded when the Cisco IOS software image was loaded.

Command Modes

Privileged EXEC (#)

Command History

| Release    | Modification                                               |
|------------|------------------------------------------------------------|
| 12.2(1)XF1 | This command was introduced for the Cisco uBR10012 router. |

Usage Guidelines

By default, the Cisco uBR10012 router automatically loads all required microcode on to the PXF processors and other line cards when it loads the Cisco IOS software image. Also, the PRE1 module automatically reloads the microcode on a card when certain faults occur, allowing the card to recover from the fault.

You can reload the microcode on the PRE1 module or on all line cards that support downloadable microcode by using the **microcode reload** command. Typically, this is not needed and should be done only upon the advice of Cisco TAC or field service engineers.



Tip

You can also reload the microcode on the PXF processors or on all cards using the **microcode** command in global configuration mode.

Examples

The following example shows how to reload the microcode on all PRE processors and line cards that support downloadable microcode:

```
Router# microcode reload all
Reload microcode? [confirm] yes
```

```
00:49:41: Downloading Microcode: file=system:pxf/ubr10k-1-ucode.122.1.0, version=122.1.0,
description=Release Software created Wed 17-Jul-02 16:58
```

```
<<list of interfaces going down or coming up>>
```

```
00:49:42: !!pxf clients started, forwarding code operational!!
```

```
Router#
```

The following example shows a typical list of devices that you can use when loading microcode for the PXF processors. This list might vary, depending on whether a standby PRE1 module is installed and depending on the version of Cisco IOS software being used.

```
Router# microcode reload pxf ?
```

```
bootflash: location of microcode
disk0: location of microcode
disk1: location of microcode
flash: location of microcode
ftp: location of microcode
null: location of microcode
nvram: location of microcode
rcp: location of microcode
scp: location of microcode
sec-bootflash: location of microcode
sec-disk0: location of microcode
sec-disk1: location of microcode
sec-nvram: location of microcode
sec-slot0: location of microcode
sec-slot1: location of microcode
slot0: location of microcode
slot1: location of microcode
system: location of microcode
tftp: location of microcode
<cr>
```

```
Router#
```

The following example shows how to reload the microcode on the PXF processors on the PRE1 module, using a specific image that is stored in the Flash memory:

```
Router# microcode reload pxf flash:pxf/ubr10k-1-ucode.122.1.0.4
Reload microcode? [confirm] yes
```

```
3d00h: Downloading Microcode: file=flash:pxf/ubr10k-1-ucode.122.1.0.4, version=122.1.0.4,
description=Release Software created Thu 27-Jun-02 16:05
```

```
<<list of interfaces going down or coming up>>
```

```
3d00h: !!pxf clients started, forwarding code operational!!
```

```
Router#
```

## Related Commands

| Command                   | Description                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------|
| <b>hw-module reset</b>    | Resets a particular PRE1 module or a particular line card.                                          |
| <b>microcode</b>          | Reloads the microcode software images on one or all line cards that support downloadable microcode. |
| <b>show pxf microcode</b> | Displays display identifying information for the microcode being used on the PXF processors.        |

■ microcode reload (uBR10012)

# mode (redundancy)

To configure the redundancy mode of operation, use the **mode** command in redundancy configuration mode.

## Cisco 7304 Router

```
mode { rpr | rpr-plus | sso }
```

## Cisco 7500 Series Routers

```
mode { hsa | rpr | rpr-plus | sso }
```

## Cisco 10000 Series Routers

```
mode { rpr-plus | sso }
```

## Cisco 12000 Series Routers

```
mode { rpr | rpr-plus | sso }
```

## Cisco uBR10012 Universal Broadband Router

```
mode { rpr-plus | sso }
```

### Syntax Description

|                 |                                                         |
|-----------------|---------------------------------------------------------|
| <b>rpr</b>      | Route Processor Redundancy (RPR) redundancy mode.       |
| <b>rpr-plus</b> | Route Processor Redundancy Plus (RPR+) redundancy mode. |
| <b>sso</b>      | Stateful Switchover (SSO) redundancy mode.              |
| <b>hsa</b>      | High System Availability (HSA) redundancy mode.         |

### Command Default

The default mode for the Cisco 7500 series routers is HSA.  
The default mode for the Cisco 7304 router and Cisco 10000 series routers is SSO.  
The default mode for the Cisco 12000 series routers is RPR.  
The default mode for the Cisco uBR10012 universal broadband router is SSO.

### Command Modes

Redundancy configuration (config-red)

### Command History

| Release    | Modification                                                                                                               |
|------------|----------------------------------------------------------------------------------------------------------------------------|
| 12.0(16)ST | This command was introduced.                                                                                               |
| 12.0(22)S  | SSO support was added.                                                                                                     |
| 12.2(18)S  | This command was integrated into Cisco IOS Release 12.2(18)S.                                                              |
| 12.2(20)S  | Support was added for the Cisco 7304 router. The Cisco 7500 series router is not supported in Cisco IOS Release 12.2(20)S. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                             |

| Release     | Modification                                                                                         |
|-------------|------------------------------------------------------------------------------------------------------|
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                      |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                      |
| 12.2(33)SCE | This command was modified in Cisco IOS Release 12.2(33)SCE. The <b>rpr-plus</b> keyword was removed. |

### Usage Guidelines

The mode selected by the **mode** command in redundancy configuration mode must be fully supported by the image that has been set into both the active and standby Route Processors (RPs). A high availability image must be installed into the RPs before RPR can be configured. Use the **hw-module slot image** command to specify a high availability image to run on the standby RP.

For Cisco IOS Release 12.2(33)SCA on the Cisco 10000 series routers and the Cisco uBR10012 universal broadband router, the use of SSO redundancy mode is recommended because RPR+ redundancy mode is being removed. If you enable RPR+ redundancy mode, you may see the following message:

```

* Warning, The redundancy mode RPR+ is being deprecated *
* and will be removed in future releases. Please change *
* mode to SSO: *
* redundancy *
* mode sso *

```

### Examples

The following example configures RPR+ redundancy mode on a Cisco 12000 series or Cisco 1000 series router:

```
Router# mode rpr-plus
```

The following example sets the mode to HSA on a Cisco 7500 series router:

```
Router# mode hsa
```

### Related Commands

| Command                            | Description                                                                                        |
|------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>clear redundancy history</b>    | Clears the redundancy event history log.                                                           |
| <b>hw-module slot image</b>        | Specifies a high availability Cisco IOS image to run on an active or standby Route Processor (RP). |
| <b>redundancy</b>                  | Enters redundancy configuration mode.                                                              |
| <b>redundancy force-switchover</b> | Forces the standby Route Processor (RP) to assume the role of the active RP.                       |
| <b>show redundancy</b>             | Displays current active and standby Performance Routing Engine (PRE) redundancy status.            |

# modular-host subslot

To specify the modular-host line card that will be used for DOCSIS 3.0 downstream or downstream channel bonding operations, use the **modular-host subslot** command in controller configuration mode. To remove the modular-host line card used for DOCSIS 3.0 downstream or downstream channel bonding operations, use the **no** form of this command.

**modular-host subslot** *slot/subslot*

**no modular-host subslot** *slot/subslot*

|                           |                     |                                             |
|---------------------------|---------------------|---------------------------------------------|
| <b>Syntax Description</b> | <i>slot/subslot</i> | The location of the modular-host line card. |
|---------------------------|---------------------|---------------------------------------------|

|                        |                                                                                                             |  |
|------------------------|-------------------------------------------------------------------------------------------------------------|--|
| <b>Command Default</b> | No modular-host line card is configured for DOCSIS 3.0 downstream or downstream channel bonding operations. |  |
|------------------------|-------------------------------------------------------------------------------------------------------------|--|

|                      |                                              |
|----------------------|----------------------------------------------|
| <b>Command Modes</b> | Controller configuration (config-controller) |
|----------------------|----------------------------------------------|

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.      |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

|                         |                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command specifies the modular-host line card for DOCSIS 3.0 downstream or downstream channel bonding operations. This applies to the cable interface line card (for example, the Cisco uBR10-MC5X20S-D line card) that is used for these operations. The Wideband SPA itself does not support DOCSIS 3.0 downstream channel bonding operations. |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## Note

A maximum of 3 SPA controllers can be hosted on a single cable interface line card.

|                 |                                                                                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to configure the modular-host line card for DOCSIS 3.0 downstream channel bonding operations for the Wideband SPA located in slot/subslot/bay 1/0/0: |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# modular-host subslot 7/0
```

| Related Commands | Command                 | Description                                                         |
|------------------|-------------------------|---------------------------------------------------------------------|
|                  | <b>annex modulation</b> | Sets the annex and modulation for the Wideband SPA.                 |
|                  | <b>cable rf-channel</b> | Associates an RF channel on a Wideband SPA with a wideband channel. |

| Command                                               | Description                                                                    |
|-------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>controller modular-cable</b>                       | Enters controller configuration mode to configure the Wideband SPA controller. |
| <b>ip-address (controller)</b>                        | Sets the IP address of the Wideband SPA FPGA.                                  |
| <b>rf-channel frequency</b>                           | Sets the frequency for each RF channel.                                        |
| <b>rf-channel ip-address<br/>mac-address udp-port</b> | Sets the IP address, MAC address and UDP port for each RF channel.             |
| <b>rf-channel network delay</b>                       | Specifies the CIN delay for each RF channel.                                   |
| <b>rf-channel description</b>                         | Specifies the description for each RF channel.                                 |
| <b>rf-channel cable downstream<br/>channel-id</b>     | Assigns a downstream channel ID to an RF channel.                              |



# monitoring-basics

To specify the type of monitoring for subscriber traffic management on a Cisco CMTS router, use the **monitoring-basics** command in enforce-rule configuration mode. To disable the selected monitoring, use the **no** form of this command.

**monitoring-basics** {**legacy** | **peak-offpeak**} {**docsis10** | **docsis11**}

**no monitoring-basics** {**legacy** | **peak-offpeak**} {**docsis10** | **docsis11**}

## Syntax Description

|                     |                                                                       |
|---------------------|-----------------------------------------------------------------------|
| <b>legacy</b>       | Provides only one threshold and one monitoring duration.              |
| <b>peak-offpeak</b> | Allows the selection of two peak durations within a day.              |
| <b>docsis10</b>     | Specifies application of the enforce-rule to DOCSIS 1.0 cable modems. |
| <b>docsis11</b>     | Specifies application of the enforce-rule to DOCSIS 1.1 cable modems. |

## Command Default

The default for this command is **legacy** and **docsis10**.

## Command Modes

Enforce-rule configuration (enforce-rule)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(9a)BC  | This command was introduced.                                                                                       |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

Legacy monitoring (using the **legacy** keyword) occurs 24 hours a day, with no distinction between peak and offpeak hours. The available monitoring duration is between 10 minutes and 31 days.

Use the **peak-offpeak** keyword to set up monitoring duration and threshold for first peak, second peak, and offpeak monitoring. Each one can be different. After setting up first peak and second peak durations, the remaining hours are treated as offpeak. Monitoring happens during offpeak hours if the offpeak duration and threshold are defined. Monitoring duration is between 60 minutes and 23 hours.

## Examples

The following example shows configuration of peak-offpeak monitoring for DOCSIS 1.1 cable modems:

```
Router(enforce-rule)# monitoring-basics peak-offpeak docsis11
```

## Related Commands

| Command                                  | Description                                                                                                                               |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos enforce-rule</b>            | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>debug cable subscriber-monitoring</b> | Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.                                         |

| Command                             | Description                                                                                     |
|-------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>duration</b>                     | Specifies the time period and sample rate to be used for monitoring subscribers.                |
| <b>peak-time1</b>                   | Specifies peak and offpeak monitoring times.                                                    |
| <b>qos-profile registered</b>       | Specifies the registered QoS profile that should be used for this enforce-rule.                 |
| <b>qos-profile enforced</b>         | Specifies a QoS profile that should be enforced when users violate the registered QoS profiles. |
| <b>service-class (enforce-rule)</b> | Identifies a particular service class for cable modem monitoring in an enforce-rule.            |
| <b>show cable qos enforce-rule</b>  | Displays the QoS enforce-rules that are currently defined.                                      |
| <b>show cable subscriber-usage</b>  | Displays subscribers who are violating their registered QoS profiles.                           |

# monitoring-duration

**Note**

Effective with Cisco IOS Release 12.3(9a)BC, the **monitoring-duration** command is replaced by the **duration** command.

To specify the time period and sample rate to be used for monitoring subscribers, use the **monitoring-duration** command in enforce-rule configuration mode. To reset an enforce-rule to its default values, use the **no** form of this command.

**monitoring-duration** *minutes* [**sample-rate** *minutes*]

**no monitoring-duration**

**Syntax Description**

|                                   |                                                                                                   |
|-----------------------------------|---------------------------------------------------------------------------------------------------|
| <i>minutes</i>                    | Specifies the time (in minutes). The valid range is 10 to 10080, with a default of 360 (6 hours). |
| <b>sample-rate</b> <i>minutes</i> | (Optional) Rate of sampling, in minutes. The valid range is 1 to 30, with a default value of 15.  |

**Defaults**

The **monitoring-duration** value defaults to 360 minutes (6 hours), and the **sample-rate** value defaults to 15 minutes.

**Command Modes**

Enforce-rule configuration (enforce-rule)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                         |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced.                                                                                                                                                                                                                                                         |
| 12.2(15)BC2 | The minimum <b>sample-rate</b> was reduced to 1 minute. Also, the <b>sample-rate</b> is not allowed to be set to a value greater than the <b>monitoring-duration</b> period. If you attempt to do so, the command is ignored and both parameters remain set to their current values. |
| 12.3(9a)BC  | This command was replaced by the <b>duration</b> command.                                                                                                                                                                                                                            |

**Usage Guidelines**

The **sample-rate** *minutes* must be less than or equal to the **monitoring-duration** *minutes* period.

When you enable an enforce-rule, the Cisco CMTS router periodically checks the bandwidth being used by subscribers, to determine whether any subscribers are consuming more bandwidth than that specified by their registered QoS profile. The Cisco CMTS router keeps track of the subscribers using a sliding window that begins at each sample-rate interval and continues for the monitoring-duration period.

For example, with the default sample-rate interval of 15 minutes and the default monitoring-duration window of 360 minutes, the Cisco CMTS router samples the bandwidth usage every 15 minutes and determines the total bytes transmitted at the end of each 360-minute period. Each sample-rate interval begins a new sliding window period for which the Cisco CMTS router keeps track of the total bytes transmitted.

**Note**

The **sample-rate** interval must be less than or equal to the **monitoring-duration** period. If you attempt to set the sample-rate interval to a value greater than the monitor-duration period, the command is ignored and the parameters are unchanged.

When you change the configuration of a currently active enforce-rule, that rule begins using the new configuration immediately to manage the cable modems tracked by this enforce-rule.

For more information about the Subscriber Traffic Management feature and to see an illustration of a sample monitoring window, refer to the Subscriber Traffic Management for the Cisco CMTS Routers feature document on Cisco.com.

**Examples**

The following example shows an enforce-rule being configured for a monitoring-duration period that is 20 minutes in length, with a sampling rate of every 10 minutes:

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# monitoring-duration 20 sample-interval 10
```

The following example shows the error message that is displayed when the **sample-rate** interval is configured to be greater than the **monitoring-duration** period. In this situation, the command is ignored and the parameters remain unchanged.

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# monitoring-duration 20 sample-interval 30
```

Monitoring duration cannot be less than the Sampling interval -- so the values would remain unchanged

**Related Commands**

| Command                            | Description                                                                                                                               |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>activate-rule</b>               | Specifies the number of bytes that a subscriber can transmit during the monitoring period on a Cisco CMTS router.                         |
| <b>at-byte-count</b>               |                                                                                                                                           |
| <b>cable qos enforce-rule</b>      | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>enabled (enforce-rule)</b>      | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.                                                |
| <b>penalty-period</b>              | Specifies the time period that an enforced QoS profile should be in effect for subscribers that violate their registered QoS profiles.    |
| <b>qos-profile enforced</b>        | Specifies a QoS profile that should be enforced when users violate their registered QoS profiles.                                         |
| <b>qos-profile registered</b>      | Specifies the registered QoS profile that should be used for this enforce-rule.                                                           |
| <b>show cable qos enforce-rule</b> | Displays the QoS enforce-rules that are currently defined.                                                                                |
| <b>show cable subscriber-usage</b> | Displays subscribers who are violating their registered QoS profiles.                                                                     |

# name

To specify the name of the CMTS tag, use the **name** command in the cmts-tag configuration mode. To remove the name, use the **no** form of this command.

**name** *tag-name*

**no name** *tag-name*

## Syntax Description

|                 |                                                                                                     |
|-----------------|-----------------------------------------------------------------------------------------------------|
| <i>tag-name</i> | Name of the CMTS tag. The configured name is added to the DOCSIS load balancing group and policies. |
|-----------------|-----------------------------------------------------------------------------------------------------|

## Command Default

No default behavior or values.

## Command Modes

CMTS tag mode (cmts-tag)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Examples

The following example shows how to give name to a CMTS tag using the **name** command:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable tag 1
Router(cmts-tag)# name cisco
```

## Related Commands

| Command                                     | Description                                                                                                              |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance docsis-group</b>      | To configure a DOCSIS load balancing group on the CMTS.                                                                  |
| <b>show cable load-balance docsis-group</b> | To display real-time configuration, statistical and operational information for load balancing operations on the router. |
| <b>cable tag</b>                            | To configure a tag for a DOCSIS load balancing group on the CMTS.                                                        |

# network

To configure the DHCP address pool with the specified *network-number* and subnet *mask*, which are the DHCP *yiaddr* field and Subnet Mask (DHCP option 1) field, use the **network** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**network** *network-number* [*mask*]

**no network** *network-number* [*mask*]

## Syntax Description

|                       |                                                                                                               |
|-----------------------|---------------------------------------------------------------------------------------------------------------|
| <i>network-number</i> | The DHCP <i>yiaddr</i> field.                                                                                 |
| <i>mask</i>           | Subnet Mask (DHCP option 1). If you do not specify the <i>mask</i> value, it is supported to 255.255.255.255. |

## Command Default

DHCP settings are not configured by default.

## Command Modes

DHCP configuration

## Command History

| Release            | Modification                                                                             |
|--------------------|------------------------------------------------------------------------------------------|
| Release 12.2(4)BC1 | Supported on the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers. |

## Usage Guidelines

This command requires that you first use the **dhcp ip dhcp pool name** command in global configuration mode to enter DHCP configuration mode.



### Note

To create an address pool with a single IP address, use the **host** command instead of **network**.

For additional information about DHCP support on the Cisco CMTS, refer to the following document on Cisco.com:

- *DHCP and ToD Servers on the Cisco CMTS*

## Examples

The following example illustrates use of the **network** command with the **ip dhcp pool name** command.

```
Router# configure terminal
Router(config)# ip dhcp pool name platinum
Router(dhcp-config)# network 10.10.10.0 255.255.0.0
Router(dhcp-config)#
```

## Related Commands

|                          |                                                                           |
|--------------------------|---------------------------------------------------------------------------|
| <b>ip dhcp pool name</b> | Creates a DHCP address pool and enters DHCP pool configuration file mode. |
|--------------------------|---------------------------------------------------------------------------|

# nls

To enable Network Layer signaling (NLS) functionality, use the **nls** command in global configuration mode. To disable NLS functionality, use the **no** form of this command.

**nls [authentication]**

**no nls [authentication]**

|                           |                                                                                         |                                                                |
|---------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | <b>authentication</b> (Optional) Enables NLS protocol security authentication.          |                                                                |
| <b>Command Default</b>    | Disabled.                                                                               |                                                                |
| <b>Command Modes</b>      | Global configuration                                                                    |                                                                |
| <b>Command History</b>    | <b>Release</b>                                                                          | <b>Modification</b>                                            |
|                           | 12.3(21a)BC3                                                                            | This command was introduced.                                   |
| <b>Usage Guidelines</b>   | It is recommended that NLS message authentication is enabled all the time.              |                                                                |
| <b>Examples</b>           | The following example shows nls enabled on a router:<br><br>router (config)# <b>nls</b> |                                                                |
| <b>Related Commands</b>   | <b>Command</b>                                                                          | <b>Description</b>                                             |
|                           | <b>cpd</b>                                                                              | Enables the CPD feature.                                       |
|                           | <b>nls ag-id auth-key</b>                                                               | Configures an Authorization Group Identifier (AG ID) for CMTS. |
|                           | <b>nls resp-timeout</b>                                                                 | Configures NLS response timeout.                               |

# nls ag-id auth-key

To configure an Authorization Group Identifier (AG ID) for CMTS, use the **nls ag-id auth-key** command in global configuration mode. To disable the AG ID, use the **no** form of this command.

**nls ag-id auth-key**  
**no nls ag-id auth-key**

|                    |                      |                                                                   |
|--------------------|----------------------|-------------------------------------------------------------------|
| Syntax Description | <i>ag-id number</i>  | Authorization Group Identifier. The valid range is 1-4294967294.  |
|                    | <i>auth-key char</i> | Authentication key provisioned on CMTS. The valid range is 20-64. |

|                 |          |
|-----------------|----------|
| Command Default | Disabled |
|-----------------|----------|

|               |                      |
|---------------|----------------------|
| Command Modes | Global configuration |
|---------------|----------------------|

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.3(21a)BC3 | This command was introduced. |

**Examples**

The following example shows configuring the AG ID:

```
Router(config) # nls ag-id 345 auth-key 54
```

| Related Commands | Command                 | Description                                           |
|------------------|-------------------------|-------------------------------------------------------|
|                  | <b>cpd</b>              | Enables CPD.                                          |
|                  | <b>nls</b>              | Enables Network Layer signaliing (NLS) functionality. |
|                  | <b>nls resp-timeout</b> | Configures NLS response timeout.                      |



# nls resp-timeout

To configure the NLS response timeout, use the **nls resp-timeout** command in global configuration mode. To disable CPD, use the **no** form of this command.

**nls resp-timeout** *timeout number*

**no nls resp-timeout** *timeout number*

| <b>Syntax Description</b> | <i>timeout number</i> Controls the time CTMS will wait before getting a response for an NLS information request. The valid range is 1-60 seconds. Upon a response timeout, the CPD message is dropped.                                                                                               |         |              |              |                              |     |                                                       |                    |                                                                |  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|--------------|------------------------------|-----|-------------------------------------------------------|--------------------|----------------------------------------------------------------|--|
| <b>Command Default</b>    | The default timeout is 1 second.                                                                                                                                                                                                                                                                     |         |              |              |                              |     |                                                       |                    |                                                                |  |
| <b>Command Modes</b>      | Global configuration                                                                                                                                                                                                                                                                                 |         |              |              |                              |     |                                                       |                    |                                                                |  |
| <b>Command History</b>    | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>12.3(21a)BC3</td><td>This command was introduced.</td></tr></table>                                                                                                                                                                     | Release | Modification | 12.3(21a)BC3 | This command was introduced. |     |                                                       |                    |                                                                |  |
| Release                   | Modification                                                                                                                                                                                                                                                                                         |         |              |              |                              |     |                                                       |                    |                                                                |  |
| 12.3(21a)BC3              | This command was introduced.                                                                                                                                                                                                                                                                         |         |              |              |                              |     |                                                       |                    |                                                                |  |
| <b>Examples</b>           | The following example shows configuring the NLS response timeout:<br><pre>Router(config)#nls rssp-timeout 35</pre>                                                                                                                                                                                   |         |              |              |                              |     |                                                       |                    |                                                                |  |
| <b>Related Commands</b>   | <table><tr><th>Command</th><th>Description</th></tr><tr><td>cpd</td><td>Enables CPD.</td></tr><tr><td>nls</td><td>Enables Network Layer signalling (NLS) functionality.</td></tr><tr><td>nls ag-id auth-key</td><td>Configures an Authorization Group Identifier (AG ID) for CMTS.</td></tr></table> | Command | Description  | cpd          | Enables CPD.                 | nls | Enables Network Layer signalling (NLS) functionality. | nls ag-id auth-key | Configures an Authorization Group Identifier (AG ID) for CMTS. |  |
| Command                   | Description                                                                                                                                                                                                                                                                                          |         |              |              |                              |     |                                                       |                    |                                                                |  |
| cpd                       | Enables CPD.                                                                                                                                                                                                                                                                                         |         |              |              |                              |     |                                                       |                    |                                                                |  |
| nls                       | Enables Network Layer signalling (NLS) functionality.                                                                                                                                                                                                                                                |         |              |              |                              |     |                                                       |                    |                                                                |  |
| nls ag-id auth-key        | Configures an Authorization Group Identifier (AG ID) for CMTS.                                                                                                                                                                                                                                       |         |              |              |                              |     |                                                       |                    |                                                                |  |

# oui

To configure the Organizational Unique Identifier (OUI) of the CM for the CMTS tag, use the **oui** command in the cmts-tag configuration mode. To remove the configured OUI from the CMTS tag, use the **no** form of this command.

```
[exclude] oui oui-of-CM

no oui oui-of-CM
```

|                    |                  |                                                             |
|--------------------|------------------|-------------------------------------------------------------|
| Syntax Description | <b>exclude</b>   | (Optional) Configures the tag to exclude the specified OUI. |
|                    | <i>oui-of-CM</i> | MAC address prefix of the vendor.                           |

|                 |                                |
|-----------------|--------------------------------|
| Command Default | No default behavior or values. |
|-----------------|--------------------------------|

|               |                          |
|---------------|--------------------------|
| Command Modes | CMTS tag mode (cmts-tag) |
|---------------|--------------------------|

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCC    | This command was introduced. |

Examples

The following example shows how to configure the OUI for the CMTS tag using the **oui** command:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable tag 1
Router(cmts-tag)# oui 00.1a.c3
```

|                  |                                             |                                                                                                                          |
|------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Related Commands | <b>Command</b>                              | <b>Description</b>                                                                                                       |
|                  | <b>cable load-balance docsis-group</b>      | To configure a DOCSIS load balancing group on the CMTS.                                                                  |
|                  | <b>show cable load-balance docsis-group</b> | To display real-time configuration, statistical and operational information for load balancing operations on the router. |
|                  | <b>cable tag</b>                            | To configure a tag for a DOCSIS load balancing group on the CMTS.                                                        |

# output-rate

**Note**

Starting with Cisco IOS Release 12.2(33)SCG, the **output-rate** command is not supported on the Cisco uBR10012 router.

To specify a custom-defined output line rate to a WAN interface instead of the default output line rate, use the **output-rate** command in interface configuration mode. Use the **no** form of this command to use the default output line rate.

**output-rate** *rate*

**no output-rate**

**Syntax Description**

|             |                                                                                                   |
|-------------|---------------------------------------------------------------------------------------------------|
| <i>rate</i> | Output rate to the WAN interface, in kilobits per second. Valid values range from 1 to 1,000,000. |
|-------------|---------------------------------------------------------------------------------------------------|

**Command Default**

Gigabit Ethernet output line rate is 1,000,000 kbps.

**Command Modes**

Interface configuration (config-if)

**Command History**

| Release     | Modification                                                        |
|-------------|---------------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced.                                        |
| 12.2(33)SCG | Support for this command was removed for the Cisco uBR10012 router. |

**Usage Guidelines**

This command specifies a custom-defined output line rate for the WAN interface.

Starting with Cisco IOS Release 12.2(33)SCG, the **output-rate** command is not supported and the value 10,000 is used for the output line rate on a Cisco uBR10012 router.

**Examples**

The following example shows how to specify a custom-defined output line rate for the WAN interface:

```
Router# configure terminal
Router(config)# interface gigabitethernet 1/0/0
Router(config-if)# output-rate 100
```

**Related Commands**

| Command                                              | Description                                                                       |
|------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>show running-config interface gigabitethernet</b> | Displays the configuration settings for the specified Gigabit Ethernet interface. |
| <b>show interfaces gigabitethernet</b>               | Displays the status and configuration settings for Gigabit Ethernet interfaces.   |

# override

To override the Type/Length/Value (TLV) or SNMP when assigning a restricted load balancing group (RLBG) to CM, use the **override** command in the cmts-tag configuration mode. To reenable the TLV or SNMP when assigning a RLBG to CM, use the **no** form of this command.

- override**
- no override**

**Command Default** TLV or SNMP are effective when assigning a RLBG to CM.

**Command Modes** CMTS tag mode (cmts-tag)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

**Examples** The following example shows how to override the TLV or SNMP when assigning a RLBG using the **override** command:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable tag 1
Router(cmts-tag)# override
```

| Related Commands | Command                                     | Description                                                                                                             |
|------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
|                  | <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |
|                  | <b>cable tag</b>                            | Configures a tag for a DOCSIS load balancing group on the CMTS.                                                         |

# option

To create a DOCSIS configuration file that specifies vendor-specific information fields, or other options that are not available through the other **cable config-file** commands, use the **option** command in cable config-file configuration mode. To remove the entry for this option, use the **no** form of this command.

**option** *n* [**instance** *inst-num*] {**ascii** *string* | **hex** *hexstring* | **ip** *ip-address*}

**no option** *n*

## Syntax Description

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>                        | Specifies the configuration file option code. Valid range is 5 to 254.<br><b>Note</b> Certain values between 5 and 254 are not allowed. See <a href="#">Table 0-34</a> for more information.                                                                                                                                                                                                         |
| <b>instance</b> <i>inst-num</i> | (Optional) Specifies the instance of this option, so that you can give the same option multiple times. Valid range is 0 to 255.                                                                                                                                                                                                                                                                      |
| <b>ascii</b> <i>string</i>      | Specifies that the data is a network verification tool (NVT) ASCII string. If the string contains white space, you must surround it with quotation marks.                                                                                                                                                                                                                                            |
| <b>hex</b> <i>hexstring</i>     | Specifies the data as a raw hexadecimal string. Each byte in the hexadecimal string is two hexadecimal digits—each byte can be separated by a period, colon, or white space. A maximum of 254 bytes can be specified.<br><b>Note</b> The <b>hex</b> option must be used to specify the data in the DOCSIS Type/Length/Value (TLV) format when using the vendor-specific option ( <b>option 43</b> ). |
| <b>ip</b> <i>ip-address</i>     | Specifies an IP address.                                                                                                                                                                                                                                                                                                                                                                             |

## Command Default

No default behaviors or values

## Command Modes

Cable config-file configuration

## Command History

| Release    | Modification                                    |
|------------|-------------------------------------------------|
| 12.1(2)EC1 | This command was introduced.                    |
| 12.2(4)BC1 | Support was added to the Release 12.2 BC train. |

## Usage Guidelines

The DOCSIS specification provides for a great many options and parameters in the DOCSIS configuration files. In particular, it allows unspecified vendor-specific options that can vary from vendor to vendor and from model to model. To create a DOCSIS configuration file that references these options, use the **option** command.

The **option** command allows you to specify configuration file parameters that are not defined by the other **cable config-file** options. These options are defined in the DOCSIS Radio Frequency (RF) Interface Specification. However, certain options are not allowed because they are either reserved for DOCSIS use or because they are specified using other **cable config-file** commands.

Table 0-34 lists the options that cannot be specified by the **cable config-file option** command. Where applicable, the table shows the **cable config-file** command you can use to specify that option.

**Table 0-34 Invalid Option Codes for the cable config-file option Command**

| Option      | Description                              | Cable Config-File Command |
|-------------|------------------------------------------|---------------------------|
| 5, 6, 7, 20 | Internal Configuration File Options      | N/A                       |
| 9           | Software Upgrade Filename                | download                  |
| 12          | Modem IP Address                         | N/A                       |
| 13          | Service Not Available Response           | N/A                       |
| 17          | Baseline Privacy Interface Configuration | privacy                   |
| 18          | Maximum Number of CPE devices            | cpe max                   |
| 19          | TFTP Server Timestamp                    | timestamp                 |
| 21          | Software Upgrade TFTP Server             | download                  |



**Note**

For complete information on the other parameters and fields in DOCSIS configuration files, see Appendix C in the *DOCSIS 1.1 Radio Frequency (RF) Interface Specification*, available on the DOCSIS Cable Labs official web site at <http://www.cablemodem.com/>

### Using Option 43 (Vendor-Specific Information Fields)

The most common use of the **cable config-file option** command is to specify vendor-specific information field values, which vendors use to implement features that are unique to their products. In this case, the value for *n* must be 43. When you use the vendor-specific option (**option 43**), you must specify the data using the **hex** option.

The hexadecimal data must be presented in the DOCSIS Type/Length/Value (TLV) format, where the first byte specifies the suboption type, the second byte specifies the length of the data, and the remaining bytes specify the data itself. The exact meaning of the suboption type and data values is defined by each vendor.

For example, Cisco CMs support a vendor-specific suboption (128) that instructs the CM to download and execute a Cisco IOS configuration file. The data for this suboption is the fully qualified path name of the Cisco IOS configuration file on the TFTP server. Other vendors, however, could define vendor-specific suboption 128 to have a totally different function.

To ensure that a vendor-specific option is executed only by equipment that supports that option, the vendor ID must always be the first part of the data in an **option 43** command. The suboption number for the vendor ID function is **08**, and the data is the three byte Organization Unique Identifier (OUI) for that vendor, as issued by the Institute of Electrical and Electronics Engineers (IEEE).

The vendor could have defined a global OUI for all of their equipment, or they could have requested a separate OUI ID for different products or family of products. For example, the global OUI for Cisco equipment is **00 00 0C**.



**Note**

Each **option 43** command must specify one and only one vendor ID, and the vendor ID must be the first TLV in the **hex** data string.

### Example of Constructing an Option 43 Command

For example, to create a vendor-specific option that downloads a Cisco IOS configuration file, you would create a hexadecimal data string that first contains suboption 8, to specify the vendor ID in TLV format. You would then add the hexadecimal string that contains suboption 128, to specify the filename for the configuration file to be downloaded, in TLV format.

The TLV for the Cisco vendor ID would be **08:03:00:00:0C**, where **08** is the suboption type, **03** is the length, and **00:00:0C** is the Cisco OUI vendor ID. If the Cisco IOS filename is **ios.cfg**, the second TLV would be **80:07:69:6F:73:2E:63:66:67**, where **80** is the suboption type (128 decimal), **07** is the length of the data, and the data is the filename expressed in hexadecimal ASCII values.

The complete **hex** data string would be **08:03:00:00:0C:80:07:69:6F:73:2E:63:66:67**. The complete command would be **option 43 hex 08:03:00:00:0C:80:07:69:6F:73:2E:63:66:67**.



#### Note

When using the **option 43** command, you must manually calculate the length value for each TLV that you specify in the **hex** data string. However, you do not have to calculate the length for entire **option 43** command, because that is calculated automatically by the CMTS.



#### Caution

Be certain that you have correctly entered the TLV data when using the **hex** option. Incorrectly entered data could cause CMs to reset, go offline, or hang, requiring a power cycle before being able to continue.

The following example shows how to specify a static downstream frequency for a Cisco uBR905, Cisco uBR924, Cisco uBR925, or Cisco CVA, using the **option 43** command to specify Cisco vendor-specific option 1.

```
router(config)# cable config-file statfreq.cm
router(config-file)# option 43 hex 08:03:00:00:0C:01:04:05:7F:9F:90
router(config-file)# exit
router(config)#
```

The hexadecimal data shown in this command consists of the two TLVs shown in [Table 0-35](#):

**Table 0-35 TLV Values for Sample Option 43 Command**

| Type                                                 | Length | Value                                                                       |
|------------------------------------------------------|--------|-----------------------------------------------------------------------------|
| <b>TLV 1—Vendor ID, Suboption 8</b>                  |        |                                                                             |
| 08                                                   | 03     | 00:00:0C (the ID for Cisco cable equipment)                                 |
| <b>TLV2—Static Downstream Frequency, Suboption 1</b> |        |                                                                             |
| 1                                                    | 04     | 05:7F:9F:90 (sets the downstream for the static frequency of 92,250,000 Hz) |



#### Note

Both the Cisco vendor-specific option for a static downstream frequency and the frequency **command** instruct the CM to move to a specific downstream frequency, overriding the frequency the CM found during its initial downstream scanning. However, the vendor-specific option requires the CM to use the specified frequency—if the CM loses its lock on that frequency or can never lock on to that specific frequency, the CM cannot go online. In contrast, the **frequency** command allows the CM to scan the downstream for the next available frequency if the CM loses its lock on the originally specified frequency.

The following example shows how to configure a Cisco uBR924, Cisco uBR925, or Cisco CVA122 so that it downloads a Cisco IOS configuration file named **ios.cfg** and configures the router for two voice ports. Three vendor-specific options are included: suboption 8, which specifies the vendor ID, suboption 128, which specifies the configuration file name, and suboption 10, which specifies the number of active voice ports.

```
router(config)# cable config-file iosfile.cm
router(config-file)# option 43 hex 08:03:00:00:0C:80:07:69:6F:73:2E:63:66:67:0A:01:02
router(config-file)# exit
router(config)#
```

The hexadecimal data shown in this command consists of the three TLVs shown in [Table 0-36](#):

**Table 0-36 TLV Values for Sample Option 43 Command**

| Type                                                    | Length | Value                                                              |
|---------------------------------------------------------|--------|--------------------------------------------------------------------|
| <b>TLV 1—Vendor ID, Suboption 8</b>                     |        |                                                                    |
| 08                                                      | 03     | 00:00:0C (the ID for Cisco cable equipment)                        |
| <b>TLV2—Cisco IOS Configuration File, Suboption 128</b> |        |                                                                    |
| 80                                                      | 07     | 69:6F:73:2E:63:66:67 (ASCII hexadecimal bytes for <b>ios.cfg</b> ) |
| <b>TLV3—Number of Active Voice Ports, Suboption 10</b>  |        |                                                                    |
| 0A                                                      | 1      | 02 (two voice ports)                                               |

Cisco CMs also support giving a limited number of Cisco IOS configuration mode commands in the DOCSIS configuration file, using vendor-specific suboption 131. The following example shows how to use the **option 43** command to specify that the Cisco CM should execute the **ip http cable-monitor advance** command to enable its onboard Cable Monitor web server.

```
router(config-file)# option 43 hex 08:03:00:00:0C:83:1D:69:70:20:68:74:74:70:20:63:61:62:
6C:65:2D:6D:6F:6E:69:74:6F:72:20:61:64:76:61:6E:63:65
router(config-file)#
```

[Table 0-37](#) lists the two TLVs shown in this example:

**Table 0-37 TLV Values to Enable the Cisco Cable Monitor**

| Type                                         | Length | Value                                                                                                                                                      |
|----------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TLV 1—Vendor ID, Suboption 8</b>          |        |                                                                                                                                                            |
| 08                                           | 03     | 00:00:0C (the ID for Cisco cable equipment)                                                                                                                |
| <b>TLV2—Cisco IOS Command, Suboption 131</b> |        |                                                                                                                                                            |
| 83                                           | 1D     | 69:70:20:68:74:74:70:20:63:61:62:6C:65:2D:6D:6F:6E:69:74:6F:72:20:61:64:76:61:6E:63:65 (ASCII hexadecimal bytes for <b>ip http cable-monitor advance</b> ) |

The following example shows the **instance** keyword being used to give multiple **option 43** commands. This example uses the same commands shown in the previous three examples.

```
router(config-file)# option 43 instance 1 hex 08:03:00:00:0C:01:04:05:7F:9F:90
router(config-file)# option 43 instance 2 hex 08:03:00:00:0C:80:07:69:6F:73:2E:63:66:67:
0A:01:02
router(config-file)# option 43 instance 3 hex
08:03:00:00:0C:83:1D:69:70:20:68:74:74:70:20:63:61:62:6C:65:2D:6D:6F:6E:69:74:6F:72:20:61:
64:76:61:6E:63:65
```



```
router(config-file)#
```

The following example shows an attempt to specify two options that cannot be specified through the DOCSIS configuration file. Option 12 is reserved for the DOCSIS registration process, and Option 9 must be specified using the **download** command.

```
router(config-file)# option 12 ip 10.11.12.13
%Option 12 must not be specified manually
router(config-file)# option 9 ascii newsoftware.file
%Option 9 must be specified directly (not as raw option)
router(config-file)#
```

#### Related Commands

| Command                  | Description                                                             |
|--------------------------|-------------------------------------------------------------------------|
| <b>cable config-file</b> | Creates a DOCSIS configuration file and enters configuration file mode. |
| <b>access-denied</b>     | Disables access to the network.                                         |
| <b>channel-id</b>        | Specifies upstream channel ID.                                          |
| <b>cpe max</b>           | Specifies CPE information.                                              |
| <b>download</b>          | Specifies download information for the configuration file.              |
| <b>frequency</b>         | Specifies downstream frequency.                                         |
| <b>privacy</b>           | Specifies privacy options for baseline privacy images.                  |
| <b>service-class</b>     | Specifies service class definitions for the configuration file.         |
| <b>snmp manager</b>      | Specifies Simple Network Management Protocol (SNMP) options.            |
| <b>timestamp</b>         | Enables time-stamp generation.                                          |

# packetcable

To enable PacketCable operations on the Cisco CMTS, use the **packetcable** command in global configuration mode. To disable PacketCable operations, use the **no** form of this command.

**packetcable**

**no packetcable**

**Syntax Description** This command has no keywords or arguments.

**Command Default** PacketCable operation is disabled.

**Command Modes** Global Configuration

| Command History | Release     | Modification                                                                                              |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------|
|                 | 12.2(8)BC2  | This command was introduced for the Cisco uBR7200 series universal broadband router.                      |
|                 | 12.2(11)BC1 | Support was added for automatically creating a random Element ID when PacketCable operations are enabled. |
|                 | 12.2(15)BC1 | Support was added for the Cisco uBR10012 router.                                                          |

**Usage Guidelines** This command enables PacketCable operations on all cable interfaces and takes effect immediately. If you do not need to change any parameters from their default values, this is the only command needed to enable PacketCable operations.

In Cisco IOS Release 12.2(11)BC1 and later releases, this command also automatically creates a random Element ID for the CMTS that is in the range of 0 and 99,999. To ensure that this Element ID is unique across the entire PacketCable domain, you should use the **packetcable element-id** command.



**Note**

PacketCable operations can be configured together with HCCP N+1 redundancy, but the PacketCable states are not synchronized between the Working and Protect interfaces. If a switchover occurs, existing voice calls continue, but when the user hangs up, PacketCable event messages are not generated because the Protect interface is not aware of the previous call states. However, new voice calls can be made and proceed in the normal fashion.

**Channel Width Limitations**

The 200,000 Hz channel width cannot be used on upstreams that support PacketCable voice calls, or on any upstreams that use Unsolicited Grant Service (UGS) or UGS with Activity Detection (UGS-AD) service flows. Using this small a channel width with voice and other UGS/UGS-AD service flows results in calls being rejected because of “DSA MULTIPLE ERRORS”.

**Examples**

The following example shows PacketCable operation being enabled:

```
Router# configure terminal
Router(config)# packetcable
Router(config)#
```

The following example shows PacketCable operation being disabled (default):

```
Router# configure terminal
Router(config)# no packetcable
Router(config)#
```

**Related Commands**

| Command                                         | Description                                                                                                                                          |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>clear packetcable gate counter commit</b>    | Resets the counters that track the total number of committed gates.                                                                                  |
| <b>packetcable authorize vanilla-docsis-mta</b> | Allows Unsolicited Grant Service (UGS) service flows without a proper PacketCable gate ID when PacketCable operations are enabled on the Cisco CMTS. |
| <b>packetcable element-id</b>                   | Configures the PacketCable Event Message Element ID.                                                                                                 |
| <b>packetcable gate maxcount</b>                | Changes the maximum number of PacketCable gate IDs in the gate database on the Cisco CMTS.                                                           |
| <b>packetcable timer</b>                        | Changes the value of the different PacketCable DQoS timers.                                                                                          |
| <b>show packetcable gate</b>                    | Displays information about one or more gates in the gate database.                                                                                   |
| <b>show packetcable gate counter commit</b>     | Displays the total number of committed gates since system reset or since the counter was last cleared.                                               |
| <b>show packetcable global</b>                  | Displays the current PacketCable configuration.                                                                                                      |

# packetcable authorize vanilla-docsis-mta

To allow Unsolicited Grant Service (UGS) service flows without a proper PacketCable gate ID when PacketCable operations are enabled on the Cisco CMTS, use the **packetcable authorize vanilla-docsis-mta** command in global configuration mode. To prevent CMs from requesting non-PacketCable UGS service flows when PacketCable operations are enabled, use the **no** form of this command.

**packetcable authorize vanilla-docsis-mta**

**no packetcable authorize vanilla-docsis-mta**

## Syntax Description

This command has no keywords or arguments.

## Command Default

Non-PacketCable UGS service flows are not allowed when PacketCable operations are enabled.

## Command Modes

Global Configuration

## Command History

| Release     | Modification                                                                         |
|-------------|--------------------------------------------------------------------------------------|
| 12.2(11)BC2 | This command was introduced for the Cisco uBR7200 series universal broadband router. |
| 12.2(15)BC1 | Support was added for the Cisco uBR10012 router.                                     |

## Usage Guidelines

By default, when PacketCable operations are enabled (using the **packetcable** ccommand), CMs must follow the PacketCable protocol when requesting UGS service flows. This prevents DOCSIS CMs that do not support PacketCable operations from using DOCSIS-style UGS service flows.

If you have a mixed network that contains both PacketCable and non-PacketCable DOCSIS CMs, you can allow DOCSIS CMs to request UGS service flows by using the **packetcable authorize vanilla-docsis-mta** command. If, however, your CMTS is providing PacketCable services, use the **no packetcable authorize vanilla-docsis-mta** command to disable DOCSIS-style service flows. This is the default configuration when PacketCable operations are enabled, and it requires that CMs must provide a validly authorized gate ID before being granted a UGS service flow.

## Examples

The following example shows PacketCable operation being enabled, while still allowing DOCSIS-style UGS service flows:

```
Router# configure terminal
Router(config)# packetcable
Router(config)# packetcable authorize vanilla-docsis-mta
Router(config)#
```

The **show packetcable global** command has also been enhanced to display whether non-PacketCable DOCSIS-style UGS service flows are allowed:

```
Router# show packetcable global
```

```

Packet Cable Global configuration:
Enabled : Yes
Element ID: 12456
Max Gates : 1048576
Allow non-PacketCable UGS
Default Timer value -
 T0 : 30000 msec
 T1 : 300000 msec
 T2 : 2000 msec
 T5 : 500 msec
Router#

```

## Related Commands

| Command                                      | Description                                                                                            |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>clear packetcable gate counter commit</b> | Resets the counters that track the total number of committed gates.                                    |
| <b>packetcable</b>                           | Enables PacketCable operations on the Cisco CMTS.                                                      |
| <b>packetcable element-id</b>                | Configures the PacketCable Event Message Element ID.                                                   |
| <b>packetcable gate maxcount</b>             | Changes the maximum number of PacketCable gate IDs in the gate database on the Cisco CMTS.             |
| <b>packetcable timer</b>                     | Changes the value of the different PacketCable DQoS timers.                                            |
| <b>show packetcable gate</b>                 | Displays information about one or more gates in the gate database.                                     |
| <b>show packetcable gate counter commit</b>  | Displays the total number of committed gates since system reset or since the counter was last cleared. |
| <b>show packetcable global</b>               | Displays the current PacketCable configuration.                                                        |

# packetcable element-id

To configure the PacketCable Event Message Element ID on the Cisco CMTS, use the **packetcable element-id** command in global configuration mode. To reset the counter to its default value, use the **no** form of this command.

**packetcable element-id** *n*

**no packetcable element-id**

|                    |          |                                                                                                                                                    |
|--------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i> | PacketCable Event Message Element ID for the Cisco CMTS. The valid range is 0 through 99999, with a default that is a random number in that range. |
|--------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                      |
|-----------------|--------------------------------------|
| Command Default | A random value between 0 and 99,999. |
|-----------------|--------------------------------------|

|               |                      |
|---------------|----------------------|
| Command Modes | Global Configuration |
|---------------|----------------------|

|                 |             |                                                                                      |
|-----------------|-------------|--------------------------------------------------------------------------------------|
| Command History | Release     | Modification                                                                         |
|                 | 12.2(11)BC1 | This command was introduced for the Cisco uBR7200 series universal broadband router. |
|                 | 12.2(15)BC1 | Support was added for the Cisco uBR10012 router.                                     |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | <p>The PacketCable Event Message specification (PKT-SP-EM-I03-011221) requires that each trusted PacketCable network element that generates an Event Message MUST identify itself with a static Element ID that is unique across an entire PacketCable domain. This command allows you to configure the CMTS with an Element ID that is unique for your particular network. If you do not manually configure this parameter with the <b>packetcable element-id</b> command, it defaults to a random value between 0 and 99,999 when PacketCable operations is enabled.</p> <p>The CMTS includes the Element ID in its Event Messages, along with its timezone information. You can display the current value using the <b>show packetcable global</b> command.</p> |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                                     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows the Event Message Element ID for this particular CMTS being set to 12456:</p> <pre>Router# configure terminal Router(config)# packetcable element-id 12456 Pktcbl: Configured element ID 12456 Router(config)#</pre> |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                                         | Description                                                                                                                                          |
|------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>packetcable</b>                              | Enables PacketCable operations on the Cisco CMTS.                                                                                                    |
|                  | <b>packetcable authorize vanilla-docsis-mta</b> | Allows Unsolicited Grant Service (UGS) service flows without a proper PacketCable gate ID when PacketCable operations are enabled on the Cisco CMTS. |
|                  | <b>packetcable gate maxcount</b>                | Changes the maximum number of PacketCable gate IDs in the gate database on the Cisco CMTS.                                                           |
|                  | <b>packetcable timer</b>                        | Changes the value of the different PacketCable DQoS timers.                                                                                          |
|                  | <b>show packetcable global</b>                  | Displays the current PacketCable configuration, including the Element ID.                                                                            |

# packetcable gate maxcount

To change the maximum number of PacketCable gate IDs in the gate database on the Cisco CMTS, use the **packetcable gate maxcount** command in global configuration mode. To reset the counter to its default value, use the **no** form of this command.

```
packetcable gate maxcount n

no packetcable gate maxcount
```

|                    |          |                                                                                                                                                                                                                                    |
|--------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>n</i> | Maximum number of gate IDs to be allocated in the gate database on the CMTS. The valid range is 512 through 2097152, with a default value of 2097152 (8 * 512 * 512), which is sufficient to support 8 cable interface line cards. |
|--------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                  |
|-----------------|------------------|
| Command Default | 2097152 gate IDs |
|-----------------|------------------|

|               |                      |
|---------------|----------------------|
| Command Modes | Global Configuration |
|---------------|----------------------|

| Command History | Release     | Modification                                                                                                                                                                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(8)BC2  | This command was introduced for the Cisco uBR7200 series universal broadband router.                                                                                                                                                                               |
|                 | 12.2(11)BC2 | The maximum number of possible gates and the default number of gates were doubled from 1,048,576 to 2,097,152 to accommodate a maximum of eight cable interface line cards (where each cable interface line card can use a maximum of 512*512, or 262,144, gates). |
|                 | 12.2(15)BC1 | Support was added for the Cisco uBR10012 router.                                                                                                                                                                                                                   |

|                  |                                                                                                                                                                                                                                                                                                    |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command configures the number of gate IDs that the Cisco CMTS can store in its gate database. Because each PacketCable gate ID typically refers to both an upstream gate and a downstream gate, multiple this number by 2 to get the maximum number of gates that can be created on the CMTS. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Note

Each cable interface line card supports a maximum of 512\*512 (262,144) PacketCable gates, so ensure that you set the maximum number of gates to accommodate all installed cable interface line cards.

|          |                                                                                                                                                                                                                                                       |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows the maximum number of gate IDs being set to 524288, which is sufficient for two cable interface line cards:</p> <pre>Router# configure terminal Router(config)# packetcable gate maxcount 524288 Router(config)#</pre> |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



**Related Commands**

| Command                                         | Description                                                                                                                                          |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>packetcable</b>                              | Enables PacketCable operations on the Cisco CMTS.                                                                                                    |
| <b>packetcable authorize vanilla-docsis-mta</b> | Allows Unsolicited Grant Service (UGS) service flows without a proper PacketCable gate ID when PacketCable operations are enabled on the Cisco CMTS. |
| <b>packetcable element-id</b>                   | Configures the PacketCable Event Message Element ID.                                                                                                 |
| <b>packetcable timer</b>                        | Changes the value of the different PacketCable DQoS timers.                                                                                          |
| <b>show packetcable global</b>                  | Displays the current PacketCable configuration.                                                                                                      |

# packetcable gate send-subscriberID

To include subscriber identification in GATE-OPEN and GATE-CLOSE gate control messages, use the **packetcable gate send-subscriberID** command in global configuration mode. To remove subscriber identification information from the gate control messages, use the **no** form of this command.

**packetcable gate send-subscriberID**

**no packetcable gate send-subscriberID**

## Syntax Description

This command has no arguments or keywords.

## Command Default

No subscriber identification information is provided in the GATE-OPEN and GATE-CLOSE gate control messages.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC1 | This command was introduced.                                                                                       |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added. |

## Examples

The following example enables gate control subscriber identification information using the **packetcable gate send-subscriberID** command:

```
Router(config)# packetcable gate send-subscriberID
```

## Related Commands

| Command                        | Description                                                        |
|--------------------------------|--------------------------------------------------------------------|
| <b>packetcable</b>             | Enables PacketCable operation.                                     |
| <b>show packetcable gate</b>   | Displays information about one or more gates in the gate database. |
| <b>show packetcable global</b> | Displays the current PacketCable configuration.                    |

# packetcable timer

To change the value of the different PacketCable Dynamic Quality of Service (DQoS) timers, use the **packetcable timer** command in global configuration mode. To reset a timer to its default value, use the **no** form of this command.

**packetcable timer** { **T0** *timer-value* | **T1** *timer-value* | **multimedia T1** *timer-value* }

**no packetcable timer** { **T0** *timer-value* | **T1** *timer-value* | **multimedia T1** *timer-value* }

|                           |                                         |                                                                                                                                                                          |
|---------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>T0</b> <i>timer-value</i>            | Sets the T0 timer in milliseconds. The valid range is from 1 to 1,000,000,000 milliseconds, with a default value of 30000 milliseconds (30 seconds).                     |
|                           | <b>T1</b> <i>timer-value</i>            | Sets the T1 timer in milliseconds. The valid range is from 1 to 1,000,000,000 milliseconds, with a default value of 200000 milliseconds (200 seconds).                   |
|                           | <b>multimedia T1</b> <i>timer-value</i> | Sets the PacketCable multimedia T1 timer in milliseconds. The valid range is 1 to 1,000,000,000 milliseconds, with a default value of 200000 milliseconds (200 seconds). |

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global Configuration (config) |
|----------------------|-------------------------------|

|                        |                |                                                                                                                                 |
|------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                             |
|                        | 12.2(8)BC2     | This command was introduced for the Cisco uBR7200 series universal broadband router.                                            |
|                        | 12.2(11)BC2    | The T2 and T5 timers were removed to conform to the requirements of the PacketCable DQoS Engineering Change Notice (ECN) 02148. |
|                        | 12.2(15)BC1    | Support was added for the Cisco uBR10012 router.                                                                                |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>This command sets the following timers, which are defined in the <i>PacketCable™ Dynamic Quality-of-Service Specification</i> (PKT-SP-DQOS-I03-020116):</p> <ul style="list-style-type: none"> <li>T0 specifies the amount of time that a gate ID can remain allocated without any specified gate parameters. The timer begins counting when a gate is allocated with a Gate-Alloc command. The timer stops when a Gate-Set command marks the gate as Authorized. If the timer expires without a Gate-Set command being received, the gate is deleted.</li> <li>T1 specifies the amount of time that an authorization for a gate can remain valid. It begins counting when the CMTS creates a gate with a Gate-Set command and puts the gate in the Authorized state. The timer stops when the gate is put into the committed state. If the timer expires without the gate being committed, the CMTS must close the gate and release all associated resources.</li> </ul> |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



**Note**

The new timer values apply to all gates that are created after giving the command. Existing gates are not affected.

**Examples**

The following example shows the T0 timer being set to 20 seconds (20,000 milliseconds):

```
Router# configure terminal
Router(config)# packetcable timer T0 20000
Router(config)#
```

**Related Commands**

| Command                                         | Description                                                                                                                                          |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>packetcable</b>                              | Enables PacketCable operations on the Cisco CMTS.                                                                                                    |
| <b>packetcable authorize vanilla-docsis-mta</b> | Allows Unsolicited Grant Service (UGS) service flows without a proper PacketCable gate ID when PacketCable operations are enabled on the Cisco CMTS. |
| <b>packetcable element-id</b>                   | Configures the PacketCable Event Message Element ID.                                                                                                 |
| <b>packetcable gate maxcount</b>                | Changes the maximum number of PacketCable gate IDs in the gate database on the Cisco CMTS.                                                           |
| <b>show packetcable global</b>                  | Displays the current PacketCable configuration.                                                                                                      |

# peak-time1

To specify peak and offpeak monitoring times on a Cisco CMTS router, use the **peak-time1** command in enforce-rule configuration mode. To disable configuration of peak monitoring times, use the **no** form of this command.

**peak-time1** {*hour* | *hour:minutes*} **duration** *minutes* **avg-rate** *rate* [**peak-time2** {*hour* | *hour:minutes*} **duration** *minutes* **avg-rate** *rate*] [**duration** *offpeak-minutes* **avg-rate** *offpeak-rate*] **sample-interval** *minutes* [**penalty** *minutes*] {**downstream** | **upstream**}[**enforce**]

**no peak-time1** {*hour* | *hour:minutes*} **duration** *minutes* **avg-rate** *rate* [**peak-time2** {*hour* | *hour:minutes*} **duration** *minutes* **avg-rate** *rate*] [**duration** *offpeak-minutes* **avg-rate** *offpeak-rate*] **sample-interval** *minutes* [**penalty** *minutes*] {**downstream** | **upstream**}[**enforce**]

## Syntax Description

|                                                     |                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>hour</i>   <i>hour:minutes</i>                   | Specifies the time of day, in either hh or hh:mm format, during which monitoring occurs for the peak time.<br><br>If the time is specified in hour (hh), the valid range is 1 to 23 using a 24-hour clock.<br><br>If the time is specified in hour:minutes (hh:mm), the valid range for hour is 1 to 23 using a 24-hour clock, and the valid range for minutes is 0 to 59. |
| <b>duration</b> <i>minutes</i>                      | Specifies the size of the sliding window (in minutes) during which the subscriber usage is monitored for the first peak time, and optionally for a second peak time when used with the <b>peak-time2</b> keyword. The valid range is 60 to 1440.                                                                                                                           |
| <b>avg-rate</b> <i>rate</i>                         | Specifies the average sampling rate in kilobits per second for the specified duration. The valid range is 1 to 400000 kilobits with no default.                                                                                                                                                                                                                            |
| <b>duration</b> <i>offpeak-minutes</i>              | (Optional) Specifies the size of the sliding window (in minutes) during which the subscriber usage is monitored for the remaining offpeak time (time not specified for peak monitoring). The valid range is 60 to 1440.                                                                                                                                                    |
| <b>avg-rate</b> <i>offpeak-rate</i>                 | Specifies the average sampling rate in kilobits per second for the specified offpeak duration. The valid range is 1 to 400000 kilobits with no default.                                                                                                                                                                                                                    |
| <b>peak-time2</b> <i>hour</i>   <i>hour:minutes</i> | (Optional) Specifies the time of day during which monitoring occurs for a second peak time. The time can be specified either in hour or hour:minutes format. The valid range for hour is 1 to 23 using a 24-hour clock, and the valid range for minutes is 0 to 59.                                                                                                        |
| <b>sample-interval</b> <i>minutes</i>               | Specifies how often (in minutes) the CMTS router should sample a service flow to get an estimate of subscriber usage. The valid range is 1 to 30, with a default value of 15.                                                                                                                                                                                              |
| <b>penalty</b> <i>minutes</i>                       | (Optional) Specifies the period (in minutes) during which a cable modem can be under penalty. The valid range is 1 to 10080.                                                                                                                                                                                                                                               |
| <b>downstream</b>                                   | Specifies monitoring of traffic in the downstream direction.                                                                                                                                                                                                                                                                                                               |
| <b>upstream</b>                                     | Specifies monitoring of traffic in the upstream direction.                                                                                                                                                                                                                                                                                                                 |
| <b>enforce</b>                                      | (Optional) Specifies that the enforce-rule QoS profile should be applied automatically if a user violates their registered QoS profile.                                                                                                                                                                                                                                    |

**Command Default** Peak and offpeak monitoring is disabled. The only default value for the **peak-time1** command is the 15-minute sample interval.

**Command Modes** Enforce-rule configuration (enforce-rule)

| Command History | Release      | Modification                                                                                                                                 |
|-----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(9a)BC   | This command was introduced.                                                                                                                 |
|                 | 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                           |
|                 | 12.2(33)SCD2 | The minute-level granularity (hh:mm) for <b>peak-time1</b> and <b>peak-time2</b> duration, and the <b>penalty</b> keyword option were added. |

### Usage Guidelines



**Note**

This command is applicable only after the **monitoring-basics** command is configured with the keyword **peak-offpeak**.

You can monitor two peak monitoring periods using the initial **peak-time1** command and its options, followed by the **peak-time2** keyword and the corresponding options. The remaining hours are considered offpeak and can be monitored by configuring the optional **duration** keyword and the corresponding options.

The **penalty** duration, which is configured using the **peak-time1** command, is unique to weekdays, and takes precedence over the global penalty duration configured using the **penalty-period** command.

When you use the **show running-configuration** command to display the configuration, the keyword options for the **peak-time1** command are truncated. In the following example, “d” represents **duration** (a single peak and offpeak duration are configured), “avg” represents **avg-rate**, “sa” represents **sample-interval**, “pen” represents **penalty**, “do” represents **downstream**, and “enf” represents **enforce**:

```
Router# show running-configuration
.
.
.
peak-time1 1 d 60 avg 2 d 60 avg 40 sa 10 pen 11 do enf
```

**Examples** The following example shows an enforce-rule that defines two peak monitoring periods for upstream traffic:

```
Router(enforce-rule)# peak-time1 10:30 duration 120 avg-rate 10 peak-time2 23 duration 60
avg-rate 10 sample-interval 10 penalty 11 upstream enforce
```

### Related Commands

| Command                                  | Description                                                                                                                                                 |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos enforce-rule</b>            | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode.                   |
| <b>debug cable subscriber-monitoring</b> | Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.                                                           |
| <b>duration</b>                          | Specifies the time period and sample rate to be used for monitoring subscribers.                                                                            |
| <b>monitoring-basics</b>                 | Specifies the type of monitoring for subscriber traffic management on a Cisco CMTS router.                                                                  |
| <b>penalty-period</b>                    | Specifies the period during which an enforced quality of service (QoS) profile should be in force for subscribers who violate their registered QoS profile. |
| <b>qos-profile enforced</b>              | Specifies a QoS profile that should be enforced when users violate their registered QoS profiles. This command is applicable for DOCSIS 1.0 cable modems    |
| <b>qos-profile registered</b>            | Specifies the registered QoS profile that should be used for this enforce-rule. This command is applicable for DOCSIS 1.0 cable modems                      |
| <b>service-class (enforce-rule)</b>      | Identifies a particular service class for cable modem monitoring in an enforce-rule. This command is applicable for DOCSIS 1.1 or later cable modems.       |
| <b>show cable qos enforce-rule</b>       | Displays the QoS enforce-rules that are currently defined.                                                                                                  |
| <b>show cable subscriber-usage</b>       | Displays subscribers who are violating their registered QoS profiles.                                                                                       |
| <b>weekend peak-time1</b>                | Configures peak and offpeak subscriber monitoring over weekends on a Cisco CMTS router.                                                                     |

# penalty-period

To specify the time period that an enforced quality of service (QoS) profile should be in force for subscribers that violate their registered QoS profile, use the **penalty-period** command in enforce-rule configuration mode. To reset an enforce-rule to its default penalty period, use the **no** form of this command.

**penalty-period** *minutes* [**time-of-day** {*hour* | *hour:minutes*}] [**monitoring-on**]

**no** **penalty-period**

|                    |                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>minutes</i>                                           | Specifies a time period (in minutes) during which a cable modem (CM) can be under penalty. The range is 1 to 10080, with a default value of 10080 (7 days).                                                                                                                                                                                                                                                                                                                                                                                       |
|                    | <b>time-of-day</b> { <i>hour</i>   <i>hour:minutes</i> } | (Optional) Specifies the time of day (in hh or hh:mm format) when: <ul style="list-style-type: none"> <li>A CM that is under penalty is released from the penalty period.</li> <li>A CM that is not under penalty has its subscriber monitoring counters reset.</li> </ul> If the time of day is specified in hour (hh), the valid range is 1 to 23 using a 24-hour clock.<br><br>If the time of day is specified in hour:minutes (hh:mm), the valid range for hour is 1 to 23 using a 24-hour clock, and the valid range for minutes is 0 to 59. |
|                    | <b>monitoring-on</b>                                     | (Optional) Specifies that monitoring should be turned on after the penalty release time. If this keyword is not specified, by default, monitoring is turned off after the release time, until the end of the day, that is 00:00 hrs.                                                                                                                                                                                                                                                                                                              |

**Command Default** The default time period is 10080 minutes (7 days).

**Command Modes** Enforce-rule configuration (enforce-rule)

|                 |              |                                                                                                                           |
|-----------------|--------------|---------------------------------------------------------------------------------------------------------------------------|
| Command History | Release      | Modification                                                                                                              |
|                 | 12.2(15)BC1  | This command was introduced.                                                                                              |
|                 | 12.3(9a)BC   | This command was integrated into Cisco IOS Release 12.3(9a)BC.                                                            |
|                 | 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.        |
|                 | 12.3(23)BC2  | The <b>time-of-day</b> keyword option was added.                                                                          |
|                 | 12.3(23)SCD2 | The minute-level granularity for the <b>time-of-day</b> duration, and the <b>monitoring-on</b> keyword option were added. |



**Usage Guidelines**

When a subscriber overconsumes the maximum bandwidth that is specified in the enforce-rule, the Cisco CMTS router can automatically switch the subscriber to an enforced QoS profile for the time duration configured with the **penalty-period** command. When the penalty period expires, the Cisco CMTS router restores the subscriber to their registered QoS profile.

The penalty duration specified in the **penalty-period** command is a global configuration. This penalty duration is overridden if the individual penalty duration is already configured using the **duration**, **weekend duration**, **peaktime1** or **weekend peaktime1** commands. Similarly, if the individual penalty duration is not configured, the global penalty duration is used. [Table 38](#) explains in detail the criteria for choosing the penalty duration:

**Table 38 Criteria for Choosing Penalty Duration**

| Global Penalty-Period Configured | Weekday Penalty-Period Configuration (CLI: duration or peaktime1) | Weekend Penalty-Period Configuration (CLI: weekend duration, or weekend peaktime1) | Applied Penalty Duration for Weekdays | Applied Penalty Duration for Weekends |
|----------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|
| Yes                              | Yes                                                               | Yes                                                                                | Weekday Penalty Configuration         | Weekend Penalty Configuration         |
| Yes                              | Yes                                                               | No                                                                                 | Weekday Penalty Configuration         | Global Penalty Configuration          |
| Yes                              | No                                                                | Yes                                                                                | Global Penalty Configuration          | Weekend Penalty Configuration         |
| Yes                              | No                                                                | No                                                                                 | Global Penalty Configuration          | Global Penalty Configuration          |

If the keyword **monitoring-on** is specified, monitoring starts immediately after the cable modems are released from penalty. However if this keyword is not specified, by default, all the cable modems using the enforce-rule are not monitored until the end of day, that is, 00:00 hrs.

The penalty period continues across reboots of the cable modem, so a user cannot avoid the enforced QoS profile by trying to reset their modem and reregister on the cable network. This allows service providers to set an appropriate penalty for users who consistently exceed the allocated maximum bandwidth.

**Note**

To manually move a DOCSIS 1.0 cable modem back to its registered profile before the end of the penalty period, use the **cable modem qos profile** command. To manually move a DOCSIS 1.1(or later) cable modem back to its registered profile before the end of the penalty period, use the **cable modem {ip-address | mac-address} service-class-name** command.

When you change the configuration of a currently active enforce-rule, that rule begins using the new configuration immediately to manage the cable modems tracked by this enforce-rule.

**Note**

Before making any changes to an active enforce-rule, we recommend that you first disable the enforce rule using the **no enabled** command.

A cable modem consists of two service flows, Primary upstream and Primary downstream. If a DOCSIS 1.0 cable modem enters the penalty period because one of its service flows has exceeded its allowed bandwidth, the QoS profile of the entire modem is changed. However, if a DOCSIS 1.1 or later cable modem enters the penalty period because its upstream or downstream service flow has exceeded the allowed bandwidth threshold, the service class name is changed only for the upstream or downstream service flow.

## Examples

The following example shows an enforce-rule named “test”, which is configured with a penalty period of 1440 minutes (1 day):

```
Router# configure terminal
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# penalty-period 1440
```

The following example shows an enforce-rule named “test”, which is configured with a penalty period of 1440 minutes (1 day), but allowing the removal of the cable modems in penalty at 23:00. Monitoring will be turned off by default at 23:00, to 00:00 (1 hour):

```
Router# configure terminal
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# penalty-period 1440 time-of-day 23
```

The following example shows an enforce-rule named “test”, which is configured with a penalty period of 1440 minutes (1 day), allowing the removal of the cable modems in penalty at 23:00. However, after the cable modems are released from penalty, fresh monitoring starts, with all the subscriber monitoring counters reset to 0:

```
Router# configure terminal
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# penalty-period 1440 time-of-day 23 monitoring-on
```

## Related Commands

| Command                             | Description                                                                                                                                                                                |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos enforce-rule</b>       | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic monitoring, and enters the enforce-rule configuration mode.                                             |
| <b>duration</b>                     | Specifies the time period and sample rate to be used for monitoring subscribers.                                                                                                           |
| <b>enabled (enforce-rule)</b>       | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.                                                                                                 |
| <b>qos-profile enforced</b>         | Specifies a QoS profile that should be enforced when users violate their registered QoS profiles. This command is applicable for only DOCSIS 1.0 cable modems.                             |
| <b>qos-profile registered</b>       | Specifies the registered QoS profile that should be used for this enforce-rule. This command is applicable for only DOCSIS 1.0 cable modems.                                               |
| <b>service-class (enforce-rule)</b> | Specifies a service class (enforced or registered) that should be used for the cable modem monitoring in an enforce-rule. This command is applicable for DOCSIS 1.1 or later cable modems. |
| <b>show cable qos enforce-rule</b>  | Displays the QoS enforce-rules that are defined.                                                                                                                                           |
| <b>show cable subscriber-usage</b>  | Displays subscribers who are violating their registered QoS profiles.                                                                                                                      |

# periodic-rel-pxf enable

To enable the Reload PXF in the Standby PRE Support feature, use the **periodic-rel-pxf enable** command in redundancy configuration mode. To disable the Reload PXF in the Standby PRE feature, use the **no** form of this command.

**periodic-rel-pxf enable**

**no periodic-rel-pxf enabled**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                                       |
|----------------------|---------------------------------------|
| <b>Command Modes</b> | Redundancy configuration (config-red) |
|----------------------|---------------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCG2   | This command was introduced. |

|                         |                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>periodic-rel-pxf enable</b> command is supported on Cisco uBR10012 router only. |
|-------------------------|----------------------------------------------------------------------------------------|

|                 |                                                                                                               |
|-----------------|---------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable the Reload PXF on Standby PRE feature on the Cisco uBR10012 router: |
|-----------------|---------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# redundancy
Router(config-red)# periodic-rel-pxf enable
Router(config-red)# end
```

|                            |                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Associated Features</b> | The <b>periodic-rel-pxf enable</b> command is used to enable the <a href="#">Reload PXF on Standby PRE Support</a> feature. |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|

# ping docsis

To determine whether a specific cable modem (CM) is reachable from the CMTS at the DOCSIS MAC layer, use the **ping docsis** command in privileged EXEC mode.

**ping docsis** {*mac-addr* | *ip-addr* | **name** *fqdn*} [*count*] [**repeat** *queue-intervals*] [**verbose**]

## Syntax Description

|                                      |                                                                                                                                                                                                                                                          |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>mac-addr</i>                      | The 48-bit hardware (MAC) address of the CM. If you specify the MAC address of a CPE device, the command will resolve it to the MAC address of the CM servicing that CPE device and send the DOCSIS ping to the CM.                                      |
| <i>ip-addr</i>                       | IPv4 or IPv6 address of the CM. If you specify the IP address of a CPE device, the command will resolve it to the IP address of the CM servicing that CPE device and send the DOCSIS ping to the CM.                                                     |
| <b>name</b> <i>fqdn</i>              | Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |
| <b>repeat</b> <i>queue-intervals</i> | (Optional) Specifies the number of maintenance intervals for a queue. Valid values are from 1 to 2147483647.                                                                                                                                             |
| <b>verbose</b>                       | (Optional) Specifies verbose mode for the output, giving additional details about the packets transmitted and received.                                                                                                                                  |

## Command Default

If no count is specified, five DOCSIS ping packets are sent.

## Command Modes

Privileged EXEC (#)

## Command History

| Release    | Modification                                                     |
|------------|------------------------------------------------------------------|
| 11.3 NA    | This command was introduced for the Cisco uBR7200 series router. |
| 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.      |
| 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.      |
| 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.      |
| 12.1(1a)T1 | The command output was enhanced.                                 |
| 12.1(3)XQ1 | Support was added for wireless radio modems.                     |
| 12.1(5)EC  | Support was added for the Cisco uBR7100 series routers.          |
| 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.      |
| 12.2(1)XF1 | Support was added for the Cisco uBR10012 router.                 |
| 12.2(4)BC1 | This command was integrated into Cisco IOS Release 12.2(4)BC1.   |

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>• Support for the Cisco uBR7225VXR router was added.</li> <li>• Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>• The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |
| 12.2(33)SCC | The <b>repeat</b> keyword was added to specify maintenance intervals for queues.                                                                                                                                                                                                                                                                                                                   |

### Usage Guidelines

The DOCSIS ping is a unique Cisco patented technology that allows a cable operator to quickly diagnose the health of a channel between the CMTS router and any particular DOCSIS cable CPE device. The DOCSIS ping is similar in concept to the IP ping but uses the lower MAC layer instead of the datalink or transport layers. Using the MAC layer has two major advantages:

- A DOCSIS ping uses only 1/64 of the bandwidth of an IP ping.
- A DOCSIS ping can be used with CMs that have not yet acquired an IP address. This allows cable operators to ping CMs that were not able to complete registration or that were improperly configured at the IP layer.

In addition to providing connectivity information, the **ping docsis** command provides a real-time view and plot of requested power adjustments, frequency, timing offset adjustments, and a measure of optimal headend reception power.

If a CM responds to the **ping docsis** command, but does not respond to an IP ping, the problem could be one of the following:

- The CM is still in the registration process and has not yet come completely online. In particular, the CM could be waiting for the DHCP server to assign it an IP address.
- Severe interference or other faults on the physical layer (either the upstream or downstream).
- Significant upstream signal error, distortion, or amplitude errors, often resulting in frequent power adjustments (which are shown in the cable flap list).
- A non-DOCSIS compliant upstream carrier-to-noise power ratio (C/N) that is between 14 and 21 dB, along with a mixed modulation profile, such as ranging request/response messages being sent in QPSK mode and short and long data grants in 16-QAM mode.



#### Note

The **ping docsis** command is a DOCSIS-compliant process that can be used with any two-way DOCSIS-compliant CM; the CM does not require any special features or code. The **ping docsis** command cannot be used with telco-return CMs.



#### Note

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

Table 39 explains the different characters that can appear in the output for the **ping docsis** command:

**Table 39** *ping docsis Command Output Characters*

| Output Character | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| !                | Indicates that a successful response was received from the ping request. This indicates that the CM is reachable from the CMTS and can respond to CMTS requests at the DOCSIS MAC layer.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| .                | Indicates that a DOCSIS ping request was sent out but that the ping request timed out without receiving a response. This indicates that the CM is having difficulties maintaining DOCSIS MAC layer connectivity to the CMTS.<br><br><b>Note</b> If the <b>ping docsis</b> command displays a number of periods (.) along with exclamation points (!), it strongly indicates the presence of RF noise or physical cable and plant issues that is causing a loss of MAC layer connectivity.                                                                                                                                                 |
| a                | Indicates that a response was received but that an adjustment of frequency, power, or timing was also made in the response. This indicates that, although the upstream channel is functional, some sort of problem is forcing power averaging and other misreads of the upstream received power signals.                                                                                                                                                                                                                                                                                                                                  |
| f                | Indicates that the CMTS failed to send the DOCSIS ping request because the CM is offline, and therefore MAC-layer communication is not possible. This indicates that the CM had previously registered with the CMTS, but that at some point it stopped responding to the DOCSIS station maintenance messages and that the CMTS eventually marked the CM as offline. The CM might have lost power or might have been disconnected from the coaxial cable.<br><br><b>Tip</b> Use the <b>show cable modem</b> command with the same MAC or IP address as you used with the <b>ping docsis</b> command to show the current status of this CM. |



**Note**

If a CM is already in the flap list, the **ping docsis** command increments the hit, miss, and power-adjustment fields for it in the cable flap list.

**Examples**

The following example shows a default **ping docsis** command that sends five packets to the CM with the MAC address of 00d0.ba77.7595, with a response being received for each:

```
Router# ping docsis 00d0.ba77.7595

Queueing 5 MAC-layer station maintenance intervals, timeout is 25 msec:
!!!!
Success rate is 100 percent (5/5)

Router#
```

The following example shows the verbose output for the same command:

```
Router# ping docsis 00d0.ba77.7595 verbose

Queueing 5 MAC-layer station maintenance intervals, timeout is 25 msec:
Reply from 00d0.ba77.7595: 2 ms, tadj=-1, padj=0.50, fadj=0
Reply from 00d0.ba77.7595: 2 ms, tadj=-1, padj=0.50, fadj=0
Reply from 00d0.ba77.7595: 2 ms, tadj=-1, padj=0.50, fadj=0
Reply from 00d0.ba77.7595: 98 ms, tadj=-1, padj=0.25, fadj=0
Reply from 00d0.ba77.7595: 2 ms, tadj=-1, padj=0.25, fadj=0

Success rate is 100 percent (5/5)

Router#
```

The following example shows that the CM at 192.168.100.10 is connected to the network and is operational, but that one ping packet was lost and that several power adjustments were made during the ping process:

```
router# ping docsis 192.168.100.10

Queueing 100 MAC-layer station maintenance intervals, timeout is 25 msec:
!!!!a!!!!!!a!a!!!!!!!!!!!!!!!!!!!!aa!!!!!!!!!!a!!a!a!!aa!!!!!!..!!a!!a!
a!a!!!!!!aa!!!!!!aa!a
Success rate is 99 percent (99/100)
```

A CM that displays output such as that above (a higher percentage of successful pings but with a number of power-adjustment readings) is most likely experiencing a problem that is not bad enough to force the modem offline but that should be addressed.

If this problem is consistent for just a small number of CMs on an upstream receiver (such as a fiber node within a combining group), then the problem is likely related to in-home wiring at those modem locations. It could also be due to a cable TV network element that is on the same HFC segment.

If the problem occurs for all CMs on a single fiber node, then changing the upstream frequency or reducing the number of homes passed per combining group might improve conditions. If this does not help the situation, the problem could be due to a faulty cable drop, dirty optical connector on the node, or other physical plant problem.

The **ping docsis** command cannot be used with a CM that has not yet registered with the CMTS. The following example shows the responses for a CM that has not yet registered with the CMTS.

```
router# ping docsis 192.168.100.111
Cable modem with IP address 192.168.100.111 not registered.
Please try using MAC address instead.

router# ping docsis 0123.4567.89ab
Cable modem with MAC address 0123.4567.89ab not registered.
router#
```

The following example shows the output of the **ping docsis** command with the **repeat** keyword:

```
router# ping docsis 192.168.100.10 repeat 22

Queueing 22 MAC-layer station maintenance intervals, timeout is 25 msec:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (22/22)
```

## Related Commands

| Command                                       | Description                                                                                        |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>cable flap-list aging</b>                  | Specifies the number of days to keep a CM in the flap-list table before aging it out of the table. |
| <b>cable flap-list insertion-time</b>         | Sets the insertion time interval that determines whether a CM is placed in the flap list.          |
| <b>cable flap-list miss-threshold</b>         | Specifies miss threshold for recording a flap-list event.                                          |
| <b>cable flap-list power-adjust threshold</b> | Specifies the power-adjust threshold for recording a CM flap-list event.                           |
| <b>cable flap-list size</b>                   | Specifies the maximum number of CMs that can be listed in the flap-list table.                     |
| <b>clear cable flap-list</b>                  | Clears all the entries in the flap-list table.                                                     |
| <b>ping</b>                                   | Outputs one or more IP ping requests to a particular IP address.                                   |
| <b>show cable flap-list</b>                   | Displays the current contents of the flap list.                                                    |



# plim qos input map

To configure a priority queue on Gigabit Ethernet SPAs, use the **plim qos input map** command in interface or subinterface configuration mode. To remove a priority queue, use the no form of this command.

**plim qos input map** {cos {enable | *cos-value* queue low-latency} | ip {dscp-based | dscp *dscp-value* queue low-latency} | ip {precedence-based | precedence *precedence-value* queue low-latency} | ipv6 tc *tc-value* queue low-latency | mpls exp *exp-value* queue low-latency

| Syntax Description                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cos enable</b>                                              | Enables classification of ingress VLAN traffic according to the 802.1Q priority bits.<br><b>Note</b> This command can only be applied to VLAN interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>cos <i>cos-value</i> queue low-latency</b>                  | Classifies incoming VLAN traffic on a subinterface according to the 802.1Q priority bits and places the traffic into the appropriate queue. By default, traffic with 802.1Q priority bits set to 6 or 7 are placed in the high-priority queue and all other traffic is placed in the low-priority queue.<br><i>cos-value</i> specifies the IEEE 802.1Q/ISL CoS value from 0 to 7.<br><b>Note</b> When you configure a class of service (CoS) value on a QinQ subinterface, the CoS value applies to all QinQ subinterfaces with the same outer VLAN ID.<br><b>low-latency</b> specifies the high priority queue. |
| <b>ip dscp-based</b>                                           | Enables the classification of incoming IP traffic according to the value of the DSCP bits.<br><b>Note</b> This command only applies to physical interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>ip dscp <i>dscp-value</i> queue low-latency</b>             | Classifies incoming IP traffic according to the value of the DSCP bits and places the traffic into the appropriate queue. By default, IP traffic with the DSCP bits equal to EF will use the low-latency queue, and traffic with any other DSCP value will use the low-priority queue.<br><i>dscp-value</i> is the value of the DSCP bits. You can specify a range of values separated by a dash or a list of value. For a list of valid values, see the Usage Guidelines.<br><b>low-latency</b> specifies the high priority queue.                                                                              |
| <b>ip precedence-based</b>                                     | Enables the classification of incoming IP traffic according to the IP precedence value.<br><b>Note</b> This command applies only to physical interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>ip precedence <i>precedence-value</i> queue low-latency</b> | Classifies incoming IP traffic according to the value of the IP precedence bits and places the traffic into the appropriate queue. IP traffic with the IP precedence bits set to 6 or 7 uses the low-latency queue; all other traffic uses the low-priority queue.<br><i>precedence-value</i> is the value of the IP precedence bits (0 to 7). You can specify a range of values separated by a dash or a list of values.<br><b>low-latency</b> specifies the high priority queue.                                                                                                                               |

---

**ipv6 tc *tc-value* queue low-latency** Classifies ingress IPv6 traffic based on the value of the traffic-class bits and places the traffic into the appropriate queue. By default, IPv6 traffic with a traffic-class value equal to **ef** uses the high-priority queue and all other traffic uses the low-priority queue. Only the most significant six bits of the traffic-class octet is used for the classification.

**Note** This command applies only to physical interfaces.

*tc-value* is the value of the traffic class bits. You can specify a range of values separated by a dash or a list of values. For a list of valid values, see the Usage Guidelines.

**low-latency** specifies the high priority queue.

---

**mpls exp *exp-value* queue low-latency** Classifies incoming MPLS traffic according to the value of the EXP bits and places the traffic into the appropriate queue. By default, traffic with the EXP bits set to 6 or 7 uses the high-priority queue and all other traffic uses the low-priority queue.

**Note** This command applies only to physical interfaces.

*exp-value* is the value of the EXP bits (0 to 7). You can specify a range of values separated by a dash or a list of values.

**low-latency** specifies the high priority queue.

---

#### Defaults

Disabled

#### Command Modes

Interface or subinterface configuration

#### Command History

| Cisco IOS Release | Modification                                                                        |
|-------------------|-------------------------------------------------------------------------------------|
| 12.2(33)SB        | This command was introduced on the Cisco 10000 series router for the PRE3 and PRE4. |
| 12.2(33)SCB       | This command was integrated into Cisco IOS Release 12.2(33)SCB.                     |

#### Usage Guidelines

The **plim qos input map** command separates high-priority traffic from low-priority traffic and places the traffic in the appropriate interface queue. The command separates priority and non-priority traffic at the SPA interface processor (SIP) to prevent the dropping of high priority traffic in an oversubscription case. Each shared port adaptor (SPA) supports one priority queue.

The router supports the following classification types for the prioritization of ingress traffic on the Gigabit Ethernet SPAs:

- VLAN 802.1Q priority bits
- IP DSCP bits
- IP precedence bits
- IPv6 traffic class bits
- MPLS experimental (EXP) bits

For the **plim qos input map ip dscp *dscp-value* queue low-latency** command, valid values for *dscp-value* are one of the following:

- 0 to 63—Differentiated services codepoint value
- af11—001010
- af12—001100
- af13—001110
- af21—010010
- af22—010100
- af23—010110
- af31—011010
- af32—011100
- af33—011110
- af41—100010
- af42—100100
- af43—100110
- cs1—Precedence 1 (001000)
- cs2—Precedence 2 (010000)
- cs3—Precedence 3 (011000)
- cs4—Precedence 4 (100000)
- cs5—Precedence 5 (101000)
- cs6—Precedence 6 (110000)
- cs7—Precedence 7 (111000)
- default—000000
- ef—101110

For the **plim qos input map ipv6 tc *tc-value* queue low-latency** command, valid values for *tc-value* are one of the following:

- 0 to 63—Differentiated services codepoint value
- af11—001010
- af12—001100
- af13—001110
- af21—010010
- af22—010100
- af23—010110
- af31—011010
- af32—011100
- af33—011110
- af41—100010
- af42—100100

- af43—100110
- cs1—Precedence 1 (001000)
- cs2—Precedence 2 (010000)
- cs3—Precedence 3 (011000)
- cs4—Precedence 4 (100000)
- cs5—Precedence 5 (101000)
- cs6—Precedence 6 (110000)
- cs7—Precedence 7 (111000)
- default—000000
- ef—101110

### Examples

The following example enables DSCP-based classification on the SPA that is located in subslot 0 of the SIP in slot 1 of the Cisco 10000 series router:

```
Router(config)# interface gigabitethernet 3/0/1
Router(config-if)# plim qos input map ip dscp-based
```

### Related Commands

| Command                 | Description                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>card</b>             | Preprovisions the SIP-600 and SPAs.                                                                                         |
| <b>negotiation auto</b> | Enables autonegotiation on a Gigabit Ethernet SPA interfaces on the Cisco 10000 SIP-600.                                    |
| <b>mtu</b>              | Configures the maximum packet size for an interface. The default is 1500 bytes. The maximum configurable MTU is 9129 bytes. |

# policy

To select modems based on the type of service flow that is balanced, use the **policy** command in the config-lb-group configuration mode. To reset the selection, use the **no** form of this command.

**policy** {pcmm | ugs | us-across-ds | pure-ds-load}

**no policy** {pcmm | ugs | us-across-ds | pure-ds-load}

| Syntax Description | <b>pcmm</b>         | Enables balancing of modems with active PCMM service flows.                                          |
|--------------------|---------------------|------------------------------------------------------------------------------------------------------|
|                    | <b>ugs</b>          | Enables balancing of modems with active UGS service flows.                                           |
|                    | <b>us-across-ds</b> | Sets load balancing on upstream (US) groups across downstream (DS) and DS group methods are ignored. |
|                    | <b>pure-ds-load</b> | Considers DS load and not US load when calculating DS utilization.                                   |
|                    |                     |                                                                                                      |

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                                                    |
|----------------------|----------------------------------------------------|
| <b>Command Modes</b> | DOCSIS load balancing group mode (config-lb-group) |
|----------------------|----------------------------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

|                 |                                                                                                                                                      |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to select the modems on the CMTS based on the type of service flow that is balanced using the <b>policy</b> command. |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# policy pure-ds-load
Router(config-lb-group)#
```

| Related Commands | Command                                     | Description                                                                                                             |
|------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
|                  | <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |

# prefix

To configure an IPv4 or IPv6 prefix in a source address verification (SAV) group, use the **prefix** command in SAV configuration mode. To disable the use of a configured prefix in a SAV group, use the **no** form of this command.

```

prefix { ipv4_prefix/ipv4_prefix_length | ipv6_prefix/ipv6_prefix_length }

no prefix { ipv4_prefix/ipv4_prefix_length | ipv6_prefix/ipv6_prefix_length }

```

## Syntax Description

|                           |                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------|
| <i>ipv4_prefix</i>        | IPv4 prefix associated with a particular SAV group, specified in the X.X.X.X/X format.   |
| <i>ipv4_prefix_length</i> | Length of the IPv4 prefix. The valid range is from 0 to 32.                              |
| <i>ipv6_prefix</i>        | IPv6 prefix associated with a particular SAV group, specified in the X:X:X:X::/X format. |
| <i>ipv6_prefix_length</i> | Length of the IPv6 prefix. The valid range is from 0 to 128.                             |

## Command Default

None

## Command Modes

SAV Configuration (config-sav)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

The **prefix** command is used to configure IPv4 or IPv6 prefixes within a particular SAV groups. The Cisco CMTS uses these prefixes to authenticate a cable modem (CM). A CM may be configured with an IPv4 or IPv6 prefix belonging to a particular SAV group. The time, length, value (TLV) 43.7.2 specifies the prefix associated with the CM. The Cisco CMTS considers a packet from a CM authorized if that packet is sourced with an IP address that belongs to the configured prefix in a SAV group.

A maximum of four prefixes are supported on one SAV group. These prefixes can be either IPv4s, IPv6s, or a combination of both prefixes (maximum up to four)

## Examples

The following example shows how to configure a SAV group with one IPv4 prefixes and one IPv6 prefixes:

```

Router(config)# cable source-verify group sav1
Router(config)# prefix 10.16.0.0/12
Router(config)# prefix 10::/12
Router(config)# exit

```

| Command                                      | Description                    |
|----------------------------------------------|--------------------------------|
| <b>cable source-verify enable-sav-static</b> | Enables SAV prefix processing. |
| <b>cable source-verify group</b>             | Configures SAV groups.         |

# profile-description

To provide a profile description for each profile in the selected cable multicast authorization profile, use the **profile-description** command in multicast authorization profile configuration mode. To remove the profile description, use the **no** form of this command.

```

profile-description profile-description

no profile-description profile-description

```

|                           |                            |                                                                                                                   |
|---------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>profile-description</i> | Specifies profile description for the selected profile. You can use up to 128 characters to describe the profile. |
|---------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------|

|                        |                               |
|------------------------|-------------------------------|
| <b>Command Default</b> | Profile description is empty. |
|------------------------|-------------------------------|

|                      |                                                      |
|----------------------|------------------------------------------------------|
| <b>Command Modes</b> | Multicast authorization configuration—(config-mauth) |
|----------------------|------------------------------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCC    | This command was introduced. |

|                         |                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command is available only from the cable multicast authorization profile mode. |
|-------------------------|-------------------------------------------------------------------------------------|

**Examples**

The following example shows how to enter a profile description for a multicast authorization profile name:

```

Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable multicast auth profile-name
Router(config)# cable multicast auth profile-name gold
Router(config-mauth)# profile-description gold-configured-may

```

| <b>Related Commands</b> | <b>Command</b>                                             | <b>Description</b>                                  |
|-------------------------|------------------------------------------------------------|-----------------------------------------------------|
|                         | <b>cable multicast authorization enable default-action</b> | Enables the cable multicast authorization features. |
|                         | <b>cable multicast authorization profile-name</b>          | Defines the cable multicast authorization profile.  |
|                         |                                                            |                                                     |



| Command                                    | Description                                                                                                       |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show cable multicast authorization</b>  | Displays the list of defined multicast authorization profiles and all CMs associated with corresponding profiles. |
| <b>show running-config interface cable</b> | Displays the running configuration for each of the cable interfaces.                                              |

# protect-tunnel

To configure a Downstream External PHY Interface (DEPI) tunnel for the protect cable interface line card on a Cisco CMTS router, use the **protect-tunnel** command in global configuration mode. To disable this configuration, use the **no** form of this command.

```
protect-tunnel protect-depi-tunnel-name

no protect-tunnel protect-depi-tunnel-name
```

|                    |                                                                                        |
|--------------------|----------------------------------------------------------------------------------------|
| Syntax Description | <i>protect-tunnel-name</i> DEPI tunnel name for the protect cable interface line card. |
|--------------------|----------------------------------------------------------------------------------------|

|                 |                                              |
|-----------------|----------------------------------------------|
| Command Default | The N+1 DEPI redundancy feature is disabled. |
|-----------------|----------------------------------------------|

|               |                               |
|---------------|-------------------------------|
| Command Modes | Global configuration (config) |
|---------------|-------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The protect tunnel must be explicitly configured. The working tunnel and the protect tunnel are configured using the same <b>depi-tunnel</b> command. The protect tunnel inherits L2TP class and DEPI class parameters from the working tunnel. When you configure the protect tunnel and specify the destination IP address for the protect tunnel, the protect tunnel inherits the QAM channel parameters specified for the working tunnel. |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to configure a DEPI tunnel for the protect cable interface line card on the Cisco uBR10012 router:</p> <pre>Router&gt; enable Router# configure terminal Router(config)# depi-tunnel protect1 Router(config-depi-tunnel)# dest-ip 192.0.2.103 Router(config-depi-tunnel)# exit Router(config)# depi-tunnel depi-tunnel working1 Router(config-depi-tunnel)# protect-tunnel protect1 Router(config-depi-tunnel)# end</pre> |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command            | Description                                                  |
|------------------|--------------------|--------------------------------------------------------------|
|                  | <b>depi-tunnel</b> | Specifies a template for DEPI tunnel configuration settings. |

# privacy

To create a DOCSIS configuration file that enables and configures the DOCSIS Baseline Privacy Interface (BPI) option, use the **privacy** command in cable config-file configuration mode. To disable BPI for the CM, use the **no** form of this command.

**privacy grace-time** { **authorization** *value* | **tek** *value* }

**privacy timeout** { **authorize** *value* | **operational** *value* | **re-authorize** *value* | **reject** *value* | **rekey** *value* }

**no privacy grace-time** { **authorization** | **tek** }

**no privacy timeout** { **authorize** | **operate** | **re-authorize** | **reject** | **rekey** }

## Syntax Description

|                                   |                                                                                                        |
|-----------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>authorization</b> <i>value</i> | Authorization grace time in seconds. Valid values are 1 to 1800 seconds. Default value is 600 seconds. |
| <b>tek</b> <i>value</i>           | TEK grace time in seconds. Valid range is 1 to 1800 seconds. Default is 600 seconds.                   |
| <b>authorize</b> <i>value</i>     | Authorize wait timeout in seconds. Valid range is 1 to 30 seconds. Default value is 10 seconds.        |
| <b>operational</b> <i>value</i>   | Operational Wait timeout in seconds. Valid range is 1 to 10 seconds. Default is 1 second.              |
| <b>re-authorize</b> <i>value</i>  | Re-authorize wait timeout in seconds. Valid range is 1 to 20 seconds.                                  |
| <b>reject</b> <i>value</i>        | Authorize reject wait timeout in seconds. Valid range is 1 to 600 seconds. Default is 60 seconds.      |
| <b>rekey</b> <i>value</i>         | Rekey wait timeout in seconds. Valid range is 1 to 10 seconds. Default is 1 second.                    |

## Command Default

No default behaviors or values

## Command Modes

Cable config-file configuration

## Command History

| Release     | Modification                                             |
|-------------|----------------------------------------------------------|
| 12.1(2)EC1  | This command was introduced.                             |
| 12.2(11)BC2 | This command was supported on the Release 12.2 BC train. |

## Usage Guidelines

Specifying the **privacy** command without any of the keywords and arguments enables BPI encryption and decryption for the CM. In addition to this command, you must also specify the **service-class privacy** command to enable BPI operations on the cable modem.



**Note**

The **privacy** command appears and is supported only in images with support for BPI or BPI+ encryption. This option configures the CM for BPI or BPI+ encryption. To use BPI encryption, the Cisco CMTS must also be configured for BPI or BPI+ encryption, using the **cable privacy** command.

**Examples**

The following example shows how to set the CM privacy TEK gracetime to 1200 seconds and enables BPI operations for the cable modem.

```
router(config)# cable config-file bpi.cm
router(config-file)# privacy grace-time tek 1200
router(config-file)# service-class 1 privacy
router(config-file)# exit
router(config)#
```

**Related Commands**

| Command                  | Description                                                             |
|--------------------------|-------------------------------------------------------------------------|
| <b>access-denied</b>     | Disables access to the network.                                         |
| <b>cable config-file</b> | Creates a DOCSIS configuration file and enters configuration file mode. |
| <b>cable privacy</b>     | Enables BPI or BPI+ encryption on the Cisco CMTS.                       |
| <b>channel-id</b>        | Specifies upstream channel ID.                                          |
| <b>cpe max</b>           | Specifies CPE information.                                              |
| <b>download</b>          | Specifies download information for the configuration file.              |
| <b>frequency</b>         | Specifies downstream frequency.                                         |
| <b>option</b>            | Provides config-file options.                                           |
| <b>service-class</b>     | Specifies service class definitions for the configuration file.         |
| <b>snmp manager</b>      | Specifies Simple Network Management Protocol (SNMP) options.            |
| <b>timestamp</b>         | Enables time-stamp generation.                                          |







## Cable Commands: q through sg

Revised: August 12, 2013, OL-15510-17

### New Commands

| Command                                          | Cisco IOS Software Release |
|--------------------------------------------------|----------------------------|
| <b>rf-channel network-delay</b>                  | 12.3(23)BC                 |
| <b>session-range</b>                             | 12.2(33)SCA                |
| <b>rcp id</b>                                    | 12.2(33)SCB                |
| <b>receive channel</b>                           | 12.2(33)SCB                |
| <b>receive module</b>                            | 12.2(33)SCB                |
| <b>revertive</b>                                 | 12.2(33)SCA                |
| <b>service divert-rate-limit ip</b>              | 12.2(33)SCB                |
| <b>service divert-rate-limit ip trusted-site</b> | 12.2(33)SCB                |
| <b>service divert-rate-limit non-ip</b>          | 12.2(33)SCB                |
| <b>service divert-rate-limit trusted-site</b>    | 12.2(33)SCB                |
| <b>restricted</b>                                | 12.2(33)SCC                |
| <b>rf-channel depi-tunnel</b>                    | 12.2(33)SCC                |
| <b>rf-channel rf-power</b>                       | 12.2(33)SCC                |
| <b>rf-channel rf-shutdown</b>                    | 12.2(33)SCC                |
| <b>service class(cmts-tag)</b>                   | 12.2(33)SCC                |
| <b>service-type-id</b>                           | 12.2(33)SCC                |
| <b>service-type-id(cmts-tag)</b>                 | 12.2(33)SCC                |
| <b>service instance</b>                          | 12.2(33)SCC                |
| <b>rf-channel stacking</b>                       | 12.2(33)SCD                |
| <b>rf-switch auxport enable</b>                  | 12.2(33)SCG                |

**Modified Commands**

| <b>Command</b>                                     | <b>Cisco IOS Software Release</b> |
|----------------------------------------------------|-----------------------------------|
| <b>redundancy force-switchover</b>                 | 12.2(33)SCA                       |
| <b>service class</b>                               | 12.2(33)SCA                       |
| <b>rf-channel frequency</b>                        | 12.3(23)BC                        |
| <b>rf-channel ip-address mac-address udp-port</b>  | 12.3(23)BC                        |
| <b>rf-channel frequency</b>                        | 12.2(33)SCB                       |
| <b>rf-channel ip-address mac-address udp-port</b>  | 12.2(33)SCB                       |
| <b>rf-channel network-delay</b>                    | 12.2(33)SCB                       |
| <b>rf-channel network-delay</b>                    | 12.2(33)SCC                       |
| <b>rf-channel rf-power</b>                         | 12.2(33)SCD                       |
| <b>service divert-rate-limit ipv6</b>              | 12.2(33)SCE                       |
| <b>service divert-rate-limit trusted-site-ipv6</b> | 12.2(33)SCE                       |

**Removed Commands**

| <b>Command</b>                   | <b>Cisco IOS Software Release</b> |
|----------------------------------|-----------------------------------|
| <b>service divert-rate-limit</b> | 12.2(33)SCB                       |
| <b>redundancy linecard-group</b> | 12.2(33)SCE                       |



## qos-profile enforced

To specify a quality-of-service (QoS) profile that should be enforced when users violate their registered QoS profiles, use the **qos-profile enforced** command in enforce-rule configuration mode. To delete the enforced QoS profile from the enforce-rule, use the **no** form of this command.

**qos-profile enforced** *profile-id* [**no-persistence**]

**no qos-profile enforced** *profile-id* [**no-persistence**]

### Syntax Description

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>profile-id</i>     | Specifies the QoS profile to be enforced. The valid range is 1 to 1023.                                                                                                                                                                                                                                                                                                                                                      |
| <b>no-persistence</b> | (Optional) Specifies that the enforced QoS profile should not remain in force when a cable modem reboots. Instead, when a cable modem that is in the penalty period reboots, it is automatically removed from the penalty period and assigned the QoS profile that is specified in its DOCSIS configuration file.<br><br>The default behavior is that enforced QoS profiles remain in force for cable modems across reboots. |

### Command Default

The value of *profile-id* defaults to 0, and enforced QoS profiles are persistent across cable modem reboots.

### Command Modes

Enforce-rule configuration (enforce-rule)

### Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(9a)BC  | This command was introduced. This command replaces the <b>enforced qos-profile</b> command.                        |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

### Usage Guidelines

Both the originally provisioned QoS profile and the enforced QoS profile must be created on the Cisco CMTS router. The *profile-id* does not support QoS profiles that are created by the cable modem.

An enforce-rule can specify an enforced QoS profile, which is automatically applied to subscribers who transmit more traffic than allowed by their registered QoS profile. The enforced QoS profile remains in effect during the penalty time period (see the **penalty-period** command). At the end of the penalty period, the subscriber returns to the registered QoS profile.

If a cable modem reboots while it is in its penalty time period, it continues using the enforced QoS profile, unless the service provider has manually changed the cable modem's registered QoS profile using the **cable modem qos profile** command.

When you change the enforced QoS profile for a currently active enforce-rule, any cable modems using this rule that are currently in the penalty period continue using the previously configured enforced QoS profile. Any cable modems that enter the penalty period after this configuration change, however, use the new enforced QoS profile.

An enforced QoS profile must already have been created on the Cisco CMTS router before you can assign it to an enforce-rule. If the rule does not exist, the system displays an error message.

When the **no-persistence** option is specified, the enforced QoS profile is still automatically applied to subscribers who violate their bandwidth requirements. However, when the cable modem reboots, the Cisco CMTS router allows the cable modem to use the QoS profile that is specified in its DOCSIS configuration file.

The **no-persistence** option can be used when initially using the Subscriber Traffic Management feature to identify potential problem applications and users. When repeat offenders are identified, they can then be assigned enforce-rules that do not use the **no-persistence** option, so that they remain in the penalty period even if they reboot their cable modems.



#### Note

The system automatically applies the enforced QoS profile to violators only if the **enforce** keyword has been used with the **activate-rule-at-byte-count** command.

## Examples

The following example shows profile 12 being assigned as the enforced QoS profile to an enforce-rule:

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# qos-profile enforced 12
```

The following example shows profile 12 being assigned as the enforced QoS profile to an enforce-rule, but with the **no-persistence** option specified, so that the enforced QoS profile does not remain in force if the cable modem reboots:

```
Router# configure terminal
Router(config)# cable qos enforce-rule residential
Router(enforce-rule)# qos-profile enforced 12 no-persistence
```

The following example shows the error message that is displayed when the specified QoS profile does not exist on the CMTS:

```
Router# configure terminal
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# qos-profile enforced 98
```

The qos profile 98 doesn't exist or it's a cm created QoS profile

## Related Commands

| Command                                  | Description                                                                                                                               |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos enforce-rule</b>            | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>debug cable subscriber-monitoring</b> | Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.                                         |
| <b>duration</b>                          | Specifies the time period and sample rate to be used for monitoring subscribers.                                                          |

| Command                             | Description                                                                                |
|-------------------------------------|--------------------------------------------------------------------------------------------|
| <b>enabled (enforce-rule)</b>       | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router. |
| <b>monitoring-basics</b>            | Specifies the type of monitoring for subscriber traffic management on a Cisco CMTS router. |
| <b>peak-time1</b>                   | Specifies peak and offpeak monitoring times on a Cisco CMTS router.                        |
| <b>qos-profile registered</b>       | Specifies the registered QoS profile that should be used for this enforce-rule.            |
| <b>service-class (enforce-rule)</b> | Identifies a particular service class for cable modem monitoring in an enforce-rule.       |
| <b>show cable qos enforce-rule</b>  | Displays the QoS enforce-rules that are currently defined.                                 |
| <b>show cable subscriber-usage</b>  | Displays subscribers who are violating their registered QoS profiles.                      |

## qos-profile registered

To specify the registered quality of service (QoS) profile that should be used for this enforce-rule, use the **qos-profile registered** command in enforce-rule configuration mode. To remove the registered QoS profile from the enforce-rule, use the **no** form of this command.

**qos-profile registered** *profile-id*

**no qos-profile registered** *profile-id*

### Syntax Description

|                   |                                                                                                                                                                                                                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>profile-id</i> | Specifies the QoS profile to be monitored. This profile must be created on the Cisco CMTS router. If you want to manage a cable modem that uses a modem-created QoS profile, you must first create that exact QoS profile on the CMTS router before using this command. The valid range is 1 to 1023. |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Command Default

The default profile ID is 0.

### Command Modes

Enforce-rule configuration (enforce-rule)

### Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(9a)BC  | This command was introduced. This command replaces the <b>registered qos-profile</b> command.                      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

### Usage Guidelines

You must specify a registered QoS profile for each enforce-rule. The Cisco CMTS router then uses the registered profile ID to match subscribers' service flows to the proper enforce-rules.

When you change the registered QoS profile for an active rule, the cable modems that had been using the previous registered QoS profile are no longer managed by the Cable ARP Filtering feature. Instead, the rule begins managing those cable modems that use the new registered QoS profile.



#### Note

The registered QoS profile must be created on the Cisco CMTS router before you can assign it to an enforce-rule. If the rule does not exist, the system displays an error message. If you want to manage a cable modem that is currently using a modem-created QoS profile, you must first manually create a new QoS profile on the CMTS router that has the same QoS parameters as the modem-created profile. Then allow the modem to come online using the manually created profile, before using the **qos-profile registered** command.

## Examples

The following example shows profile 50 being assigned as the registered QoS profile to an enforce-rule:

```
Router# configure terminal
Router(config)# cable qos enforce-rule enforce-rule
Router(enforce-rule)# qos-profile registered 50
```

The following example shows the error message that is displayed when the specified QoS profile does not exist on the CMTS:

```
Router# configure terminal
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# qos-profile registered 99
```

The qos profile 99 doesn't exist or it's a cm created QoS profile

## Related Commands

| Command                                  | Description                                                                                                                                  |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos enforce-rule</b>            | Creates an enforce-rule to to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>debug cable subscriber-monitoring</b> | Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.                                            |
| <b>duration</b>                          | Specifies the time period and sample rate to be used for monitoring subscribers.                                                             |
| <b>enabled (enforce-rule)</b>            | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.                                                   |
| <b>monitoring-basics</b>                 | Specifies the type of monitoring for subscriber traffic management on a Cisco CMTS router.                                                   |
| <b>peak-time1</b>                        | Specifies peak and offpeak monitoring times on a Cisco CMTS router.                                                                          |
| <b>qos-profile enforced</b>              | Specifies a QoS profile that should be enforced when users violate their registered QoS profiles.                                            |
| <b>service-class (enforce-rule)</b>      | Enables the enforcing of QOS profiles according to service class.                                                                            |
| <b>show cable qos enforce-rule</b>       | Displays the QoS enforce-rules that are currently defined.                                                                                   |
| <b>show cable subscriber-usage</b>       | Displays subscribers who are violating their registered QoS profiles.                                                                        |

# rcp-id

To assign a receive channel profile (RCP) ID to a receive channel configuration (RCC) template, use the **rcp-id** command in RCC template configuration mode. To remove the RCP ID, use the **no** form of this command.

**rcp-id** *rcp-id*

**no rcp-id** *rcp-id*

## Syntax Description

|               |                                                                                                     |
|---------------|-----------------------------------------------------------------------------------------------------|
| <i>rcp-id</i> | Specifies an RCP ID for the RCC template. The valid range is from 00 00 00 00 00 to FF FF FF FF FF. |
|---------------|-----------------------------------------------------------------------------------------------------|

## Command Default

By default the RCP ID is set to 00 00 00 00 00. However, you must change the default value to a non-zero RCP ID.

## Command Modes

RCC template configuration (config-rcc-template)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

A valid RCC template consists of a configured RCP ID, a receive module (RM) entry, and a receive channel (RC) entry.

First, you define an RCC template for an RCP, and then assign the template to a cable interface to generate RCCs based on the actual DS channel configuration.

## Examples

The following example shows how to assign an RCP ID to an RCC template:

```
Router# configure terminal
Router(config)# cable rcc-template 1
Router(config-rcc-template)# rcp-id 00 10 00 00 03
```

## Related Commands

| Command                | Description                                                       |
|------------------------|-------------------------------------------------------------------|
| <b>rcp-id</b>          | Specifies an ID for the receive channel profile.                  |
| <b>receive-module</b>  | Specifies a receive module entry in the form of a numeric value.  |
| <b>receive-channel</b> | Specifies a receive channel entry in the form of a numeric value. |

# receive-channel

To associate a receive channel to a receive module (RC), use the **receive-channel** command in RCC template configuration mode. To restore the default value, use the **no** form of this command.

**receive-channel** *index* **center-frequency** *Hz* **connected-receive-module** *index* [**primary**]

**no receive-channel** *index* **center-frequency** *Hz* **connected-receive-module** *index*

|                    |                                 |                                                                                                   |
|--------------------|---------------------------------|---------------------------------------------------------------------------------------------------|
| Syntax Description | <i>index</i>                    | Specifies the index value for the receive channel. The valid range is 1 to 10.                    |
|                    | <b>center-frequency</b>         | Specifies the center frequency for the receive channel.                                           |
|                    | <i>Hz</i>                       | Specifies the center frequency value in Hz. The valid range is 55000000-858000000.                |
|                    | <b>connected-receive-module</b> | Specifies a nested receive module in the RCC template.                                            |
|                    | <i>index</i>                    | Generally, only one receive module is configured for an RCC template.                             |
|                    | <b>Primary</b>                  | Specifies the index value for the connected receive module. The valid range is 1 to 10.           |
|                    |                                 | (Optional) Indicates that it is a CM primary channel and an RCC can be derived from this channel. |

**Command Default** .No default behavior or values.

**Command Modes** RCC template configuration (config-rcc-template)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCB    | This command was introduced. |

**Usage Guidelines** A valid RCC template consists of a configured RCP ID, a receive module (RM) entry, and a receive channel (RC) entry. First, you define an RCC template for an RCP, and then assign the template to a cable interface to generate RCCs based on the actual DS channel configuration.

An RCC template configures the physical layer components described by an RCP, including receive modules and receive channels to specific downstream frequencies, and specifies the interconnections among receive modules or between receive modules and receive channels.

A receive module can include multiple receive channels. So we need to specify which receive channel belongs to which receive module.

## Examples

The following example shows how to associate a receive channel to a receive module:

```
Router# configure terminal
Router(config)# cable rcc-template 1
Router(config-rcc-template)# rcp-id 00 10 00 00 03
Router(config-rcc-template)# receive-module 1 first-channel-center-frequency 555000000
Router(config-rcc-template)# receive-channel 1 center-frequency 555000000
connected-receive-module 1 primary
Router(config-rcc-template)# receive-channel 2 center-frequency 561000000
connected-receive-module 1
```

## Related Commands

| Command                   | Description                                                        |
|---------------------------|--------------------------------------------------------------------|
| <b>cable rcc-template</b> | Defines a receive channel configuration (RCC) template for an RCP. |
| <b>rcp-id</b>             | Specifies an ID for the receive channel profile.                   |
| <b>receive-module</b>     | Specifies a receive module entry in the form of a numeric value.   |



# receive-module

To associate a receive module (RC) to a Receive Channel Configuration (RCC) template, use the **receive-module** command in RCC template configuration mode. To restore the default value, use the **no** form of this command.

**receive-module** *index* **first-channel-center-frequency** *Hz* [**connected-receive-module** *index*]

**no** **receive-module** *index* **first-channel-center-frequency** *Hz* [**connected-receive-module** *index*]

## Syntax Description

|                                       |                                                                                                                                            |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <i>index</i>                          | Specifies the index value for the receive module. The valid index range is 1 to 10.                                                        |
| <b>first-channel-center-frequency</b> | Specifies the center frequency of the first channel of the receive module channel block.                                                   |
| <i>Hz</i>                             | Specifies the center frequency value in Hz. The valid range is 55000000 to 858000000.                                                      |
| <b>connected-receive-module</b>       | (Optional) Specifies a nested receive module in the RCC template.<br>Generally, only one receive module is configured for an RCC template. |
| <i>index</i>                          | (Optional) Specifies the index value for the connected receive module. The valid range is 1 to 10.                                         |

## Command Default

.No default behavior or values.

## Command Modes

RCC template configuration (config-rcc-template)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

A valid RCC template consists of a configured RCP ID, a receive module (RM) entry, and a receive channel (RC) entry. First, you define an RCC template for an RCP, and then assign the template to a cable interface to generate RCCs based on the actual DS channel configuration.

An RCC template configures the physical layer components described by an RCP, including receive modules and receive channels to specific downstream frequencies, and specifies the interconnections among receive modules or between receive modules and receive channels.

A receive module can include multiple receive channels. So we need to specify which receive channel belongs to which receive module.

## Examples

The following example shows how to associate a receive module to an RCC template:

```
Router# configure terminal
Router(config)# cable rcc-template 1
Router(config-rcc-template)# rcp-id 00 10 00 00 03
Router(config-rcc-template)# receive-module 1 first-channel-center-frequency 555000000
Router(config-rcc-template)# receive-channel 1 center-frequency 555000000
connected-receive-module 1 primary
Router(config-rcc-template)# receive-channel 2 center-frequency 561000000
connected-receive-module 1
```

## Related Commands

| Command                   | Description                                                        |
|---------------------------|--------------------------------------------------------------------|
| <b>cable rcc-template</b> | Defines a receive channel configuration (RCC) template for an RCP. |
| <b>rcp-id</b>             | Specifies an ID for the receive channel profile.                   |
| <b>receive-channel</b>    | Specifies a receive channel entry in the form of a numeric value.  |

# redundancy force-failover main-cpu

To force a switchover, so that the standby Performance Routing Engine (PRE1) module becomes the active PRE1 module, use the **redundancy force-failover main-cpu** command in privileged EXEC mode.

## redundancy force-failover main-cpu

**Syntax Description** This command has no keywords or arguments.

**Defaults** No default behavior or values

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                    |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------|
|                 | 12.2(4)XF1  | This command was introduced for the Cisco uBR10012 router.                                                      |
|                 | 12.2(11)BC3 | The active PRE1 module checks to see if a switchover is currently in progress before implementing this command. |
|                 | 12.3(21)BC  | This command is replaced by the <b>redundancy switch-activity</b> command.                                      |

**Usage Guidelines** The **redundancy force-failover main-cpu** command initiates a manual switchover, so that the standby PRE1 module becomes the active PRE1 module and assumes full responsibilities for router operations. This command requires that both PRE1 modules are running a Cisco IOS software image that supports the Route Processor Redundancy (RPR) feature.

**Note**

The terms failover and switchover are interchangeable, but switchover is the term used across all Cisco platforms capable of high-availability operation.

A manual switchover is typically done for one of the following reasons:

- You want to upgrade or replace the active PRE1 module.
- You have upgraded the Cisco IOS software on the standby PRE1 module and want the standby PRE1 module to begin using the new software image. This also allows you to upgrade the software on the former active PRE1 module without interrupting systems operations.
- You want to test switchover operation on the system.

A switchover can also be manually initiated by removing the active PRE1 module from the chassis, but using the **redundancy force-failover main-cpu** command provides a more graceful switchover, without generating hardware alarms.

**Tip**

Do not perform a switchover immediately after you change the configuration and save it to the NVRAM. Instead, wait a few minutes to allow the two PRE1 modules to synchronize the new configuration, and then perform the switchover.

**Tip**

Wait two to three minutes after a switchover before switching the system back to the original PRE1 module, so as to allow the system to stabilize and so that both PRE1 modules are ready for the switch. In Cisco IOS Release 12.2(11)BC3 and later releases, the active PRE1 module will not initiate a new switchover until a current switchover is complete and the system has stabilized.

**Examples**

The following example shows a switchover being manually initiated:

```
Router# redundancy force-failover main-cpu
Proceed with switchover to standby PRE? [confirm] y
```

**Note**

Pressing **enter** or **y** confirms the action and begins the switchover. Pressing any other key aborts the switchover and returns control to the current active PRE1 module.

The following example shows a switchover being attempted but failing because the standby PRE1 module is either not ready, not available, or not installed:

```
Router# redundancy force-failover main-cpu

Proceed with switchover to standby PRE? [confirm]
Standby PRE not ready, switchover aborted.
Router#
```

**Note**

In some versions of Cisco IOS software, a failed software switchover will show the following message:

```
Unable to communicate with standby PRE, switchover aborted.
```

**Related Commands**

| Command                           | Description                                                                                    |
|-----------------------------------|------------------------------------------------------------------------------------------------|
| <b>associate</b>                  | Associates two line cards for Automatic Protection Switching (APS) redundancy protection.      |
| <b>redundancy</b>                 | Enters redundancy configuration mode so that the synchronization parameters can be configured. |
| <b>redundancy reload</b>          | Resets the standby PRE1 module or to reset both the active and standby PRE1 modules.           |
| <b>redundancy switch-activity</b> | Forces a switchover to the standby PRE module.                                                 |

# redundancy force-switchover main-cpu

To force a standby Performance Routing Engine (PRE) to assume the role of an active PRE, use the **redundancy force-switchover main-cpu** command in privileged EXEC mode.

## redundancy force-switchover main-cpu

### Syntax Description

None.

### Command Default

This command has no default behavior or values.

### Command Modes

Privileged EXEC (#)

### Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

### Usage Guidelines

Before using this command, install the Cisco IOS software image (to ensure high availability), and configure the Route Processor Redundancy (RPR) mode on both the PRE modules.



#### Note

The terms failover and switchover are interchangeable, but switchover is the term used across all Cisco platforms capable of high-availability operation.



#### Note

We recommend you use the **redundancy force-switchover main-cpu** command only on the active PRE module. The active PRE crashes used on the standby PRE.

### Examples

The following example shows a manual switchover:

```
Router# redundancy force-switchover main-cpu
Proceed with switchover to standby PRE? [confirm] y
Preparing to Switch Activity
```



#### Note

Pressing **enter** or **y** confirms the action and begins the switchover. Pressing any other key aborts the switchover and returns control to the currently active PRE module.

The following example shows a switchover being attempted but failing because the standby PRE module is either not ready, not available, or not installed:

```
Router# redundancy force-switchover main-cpu

Proceed with switchover to standby PRE? [confirm] n

Standby PRE not ready, switchover aborted.
```

Router#

**Related Commands**

| Command                           | Description                                                                                          |
|-----------------------------------|------------------------------------------------------------------------------------------------------|
| <b>redundancy</b>                 | Enters the redundancy configuration mode so that the synchronization parameters could be configured. |
| <b>redundancy reload</b>          | Resets the standby PRE module or resets both the active and standby PRE modules.                     |
| <b>redundancy switch-activity</b> | Forces a switchover to the standby PRE module.                                                       |
| <b>show redundancy</b>            | Displays the current active and standby Supervisor card redundancy status.                           |

# redundancy reload

To manually reload a standby Route Processor (RP) module, use the **redundancy reload** command in privileged EXEC mode.

**redundancy reload {peer | shelf}**

## Syntax Description

|              |                                                                     |
|--------------|---------------------------------------------------------------------|
| <b>peer</b>  | Reloads only the standby PRE1 module or Supervisor card.            |
| <b>shelf</b> | Reloads both the active and standby PRE1 module or Supervisor card. |

## Defaults

No default behavior or values

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------|
| 12.2(4)XF1  | This command was introduced for the Cisco uBR10012 router.                                                                     |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                     |
| 12.2(33)SCA | This command was removed from Cisco IOS Release 12.2(33)SCA. It is replaced by the <b>hw-module standby-cpu reset</b> command. |
| 12.2(44)SQ  | This command was integrated into Cisco IOS Release 12.2(44)SQ. Support for the Cisco RF Gateway 10 was added.                  |
| 15.2(4)M    | This command was introduced.                                                                                                   |

## Usage Guidelines

The **redundancy reload peer** command is used to reset the standby RP module when there are any failures, tracebacks, or functionality and behavior mismatches on either one or both active and standby RP modules.

This command does not have an impact on active device operations, assuming a switchover is not required while the standby module is resetting.

The **redundancy reload shelf** command reloads the Cisco IOS software on both the active and standby RP modules. This command interrupts services on the router until all the RP modules and the line cards initialize and come back online.

## Examples

The following example shows how to manually reload the standby RP module:

```
Router# redundancy reload peer
Reload peer? [confirm] y
Preparing to reload peer
```



### Note

Pressing **enter** or **y** begins the reload. Pressing any other key aborts the reload and returns control to the active RP module.

The following is sample output when a standby RP module is not installed on a router:

```
Router# redundancy reload peer
System is running in SIMPLEX mode, reload anyway? [confirm] n
Peer reload not performed.
```

The following example shows how to reload all RP modules:

```
Router# redundancy reload shelf

Reload the entire shelf [confirm] y
Preparing to reload entire shelf
```


**Note**

Pressing **enter** or **y** begins the reload. Pressing any other key aborts the reload and returns control to the current active PRE1 module.

### Cisco RF Gateway 10

The following example shows the system response when a standby Supervisor card is not installed in the Cisco RFGW-10:

```
Switch# redundancy reload peer

System is running in SIMPLEX mode, reload anyway? [confirm] n
Peer reload not performed.
```

The following example shows how to reload both Supervisor cards on the Cisco RFGW-10:

```
Switch# redundancy reload shelf

Reload the entire shelf [confirm] y
Preparing to reload entire shelf
```


**Note**

Pressing **Enter** or **y** confirms the action and begins the reload of both cards. Pressing any other key aborts the reload and returns control to the current active Supervisor card.

### Related Commands

| Command                                   | Description                                                                                    |
|-------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>associate slot</b>                     | Associates slots for APS processor redundancy.                                                 |
| <b>redundancy</b>                         | Enters redundancy configuration mode so that the synchronization parameters can be configured. |
| <b>redundancy force-failover main-cpu</b> | Forces a switchover, so that the standby RP module becomes the active RP module.               |
| <b>redundancy switch-activity</b>         | Forces a switchover to the standby RP module.                                                  |



# redundancy switch-activity

To force a switchover to the standby PRE module, use the **redundancy switch-activity** command in privileged EXEC mode.

**redundancy switch-activity [force]**

**Note**

The terms failover and switchover are interchangeable, but switchover is the term used across all Cisco platforms capable of high-availability operation.

**Syntax Description**

|              |                                                                                                                                          |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>force</b> | (Optional) Forces a switchover immediately, overriding any checks in the code or configuration that might prevent or delay a switchover. |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------|

**Command Default**

No default behavior or values

**Command Modes**

Privileged EXEC

**Command History**

| Release    | Modification                                               |
|------------|------------------------------------------------------------|
| 12.2(4)XF1 | This command was introduced for the Cisco uBR10012 router. |

**Usage Guidelines**

The **redundancy switch-activity** command is similar to the **redundancy force-failover main-cpu** command, except that it includes an option to force the switchover, overriding any configuration checks or other checks in the software that could prevent the switchover. In all cases, this command verifies that the standby PRE module is available and capable of performing the switchover before it transfers control to that PRE module. This command also synchronizes the current running-config and client data before initiating the switchover.

**Examples**

The following example shows a switchover being manually initiated, overriding any checks that might prevent or delay the switchover:

```
Router# redundancy switch-activity force
Proceed with switchover to standby PRE? [confirm] y
```

**Note**

Pressing **enter** or **y** confirms the action and begins the switchover. Pressing any other key aborts the switchover and returns control to the current active PRE1 module.

| Related Commands | Command                                   | Description                                                                                                       |
|------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                  | <b>associate</b>                          | Associates two line cards for Automatic Protection Switching (APS) redundancy protection.                         |
|                  | <b>redundancy</b>                         | Enters redundancy configuration mode so that the synchronization parameters can be configured.                    |
|                  | <b>redundancy reload</b>                  | Resets the standby PRE1 module or to reset both the active and standby PRE1 modules.                              |
|                  | <b>redundancy force-failover main-cpu</b> | Forces a switchover, so that the standby Performance Routing Engine (PRE1) module becomes the active PRE1 module. |

# registered qos-profile



## Note

Effective with Cisco IOS Release 12.3(9a)BC, the **registered qos-profile** command is replaced by the **qos-profile registered** command.

To specify the registered quality of service (QoS) profile that should be used for this enforce-rule, use the **registered qos-profile** command in enforce-rule configuration mode. To remove the registered QoS profile from the enforce-rule, use the **no** form of this command.

**registered qos-profile** *profile-id*

**no registered qos-profile** *profile-id*

## Syntax Description

|                   |                                                                                                                                                                                                                                                                                                                             |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>profile-id</i> | Specifies the QoS profile to be monitored. This profile must be created on the Cisco CMTS router. If you want to manage a cable modem that uses a modem-created QoS profile, you must first create that exact QoS profile on the CMTS router before using this command. The valid range is 0 to 16383, with a default of 0. |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

The default profile ID is 0.

## Command Modes

Enforce-rule configuration (enforce-rule)

## Command History

| Release     | Modification                                                            |
|-------------|-------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced.                                            |
| 12.3(9a)BC  | This command was replaced by the <b>qos-profile registered</b> command. |

## Usage Guidelines

You must specify a registered QoS profile for each enforce-rule. The Cisco CMTS router then uses the registered profile ID to match subscribers' service flows to the proper enforce-rules.

When you change the registered QoS profile for an active rule, the cable modems that had been using the previous registered QoS profile are no longer managed by the Subscriber Traffic Management feature. Instead, the rule begins managing those cable modems that use the new registered QoS profile.



## Note

The registered QoS profile must be created on the Cisco CMTS router before you can assign it to an enforce-rule. If the rule does not exist, the system displays an error message. If you want to manage a CM that is using a CM-created QoS profile, you must first create a QoS profile on the Cisco CMTS router that matches the CM-created profile exactly. Then use the **registered qos-profile** command to assign that profile to this enforce-rule.

**Examples**

The following example shows profile 50 being assigned as the registered QoS profile to an enforce-rule:

```
Router# configure terminal
Router(config)# cable qos enforce-rule enforce-rule
Router(enforce-rule)# registered qos-profile 50
```

The following example shows the error message that is displayed when the specified QoS profile does not exist on the CMTS:

```
Router# configure terminal
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# registered qos-profile 99
```

The qos profile 99 doesn't exist or it's a cm created QoS profile

**Related Commands**

| Command                            | Description                                                                                                                               |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>activate-rule</b>               | Specifies the number of bytes that a subscriber can transmit during the monitoring period on a Cisco CMTS router.                         |
| <b>at-byte-count</b>               |                                                                                                                                           |
| <b>cable qos enforce-rule</b>      | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>duration</b>                    | Specifies the time period and sample rate to be used for monitoring subscribers.                                                          |
| <b>enabled (enforce-rule)</b>      | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.                                                |
| <b>penalty-period</b>              | Specifies the time period that an enforced QoS profile should be in effect for subscribers that violate their registered QoS profiles.    |
| <b>qos-profile enforced</b>        | Specifies a QoS profile that should be enforced when users violate their registered QoS profiles.                                         |
| <b>show cable qos enforce-rule</b> | Displays the QoS enforce-rules that are currently defined.                                                                                |
| <b>show cable subscriber-usage</b> | Displays subscribers who are violating their registered QoS profiles.                                                                     |

# restricted

To convert a general load balancing group (GLBG) to a restricted load balancing group (RLBG) for DOCSIS load balancing, use the **restricted** command in the config-lb-group configuration mode. To revert to the general group type for DOCSIS load balancing, use the **no** form of this command.

**restricted**

**no restricted**

**Command Default** By default, the general group type is selected for load balancing.

**Command Modes** DOCSIS load balancing group mode (config-lb-group)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

**Examples** The following example shows how to convert a GLBG to a RLBG using the **restricted** command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# restricted
Router(config-lb-group)#
```

| Related Commands | Command                                     | Description                                                                                                             |
|------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
|                  | <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |

# revertive

To enable the revert operation on a protect card, use the **revertive** command in line card redundancy group mode.

**revertive** *time*

**no revertive** *time*

| Syntax Description | <i>time</i> | Specifies the revert operation time in minutes. The valid values are 1 to 35791. |
|--------------------|-------------|----------------------------------------------------------------------------------|
|--------------------|-------------|----------------------------------------------------------------------------------|

| Command Default | None |
|-----------------|------|
|-----------------|------|

| Command Modes | Line card redundancy group (config-red-lc) |
|---------------|--------------------------------------------|
|---------------|--------------------------------------------|

| Command History | Release     | Modification                                                  |
|-----------------|-------------|---------------------------------------------------------------|
|                 | 12.2(33)SCA | This command was introduced in Cisco IOS Release 12.2(33)SCA. |

**Examples** The following example shows how to specify the revert operation time for a protect card on a uBR10012 router:

```
Router# configure terminal
Router(config)# redundancy
Router(config-red)# linecard-group 1 cable
Router(config-red-lc)# revertive 30
```

| Related Commands | Command               | Description                                                    |
|------------------|-----------------------|----------------------------------------------------------------|
|                  | <b>linecard-group</b> | Creates a line card group for one-to-one line card redundancy. |
|                  | <b>redundancy</b>     | Enters redundancy mode.                                        |
|                  | <b>member subslot</b> | Enables the redundancy role of a line card.                    |

# rf-channel cable downstream channel-id

To assign a downstream channel ID to an RF channel, use the **rf-channel cable downstream channel-id** command in controller configuration mode. To remove a downstream channel ID for an RF channel, use the **no** form of this command.

**rf-channel** *rf-port* **cable downstream channel-id** *channel-id*

**no rf-channel** *rf-port* **cable downstream channel-id** *channel-id*

## Syntax Description

|                   |                                                                                                                                                                                                                                     |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>rf-port</i>    | Specifies the RF channel physical port on the Wideband SPA FPGA. Valid values for <i>rf-port</i> depend on the configuration set with the <b>annex modulation</b> command.                                                          |
| <i>channel-id</i> | A unique channel ID. Valid values for releases prior to Cisco IOS Release 12.2(33)SCB are from 0 to 255 and the valid values for Cisco IOS Release 12.2(33)SCB and later are from 1 to 255 as 0 is reserved for network management. |

## Command Default

If the **rf-channel cable downstream channel-id** command is not issued, Cisco IOS software assigns a unique downstream channel ID to the RF channel.

## Command Modes

Controller configuration (config-controller)

## Command History

| Release      | Modification                                                    |
|--------------|-----------------------------------------------------------------|
| 12.3(21)BC   | This command was introduced for the Cisco uBR10012 router.      |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. |
| 12.2(33)SCB1 | The downstream channel ID scheme was changed.                   |

## Usage Guidelines

For the wideband channel to work correctly, each RF channel on the fiber node that the wideband channel uses must have a unique downstream channel ID. By default, Cisco IOS software assigns a unique downstream channel ID to the RF channel. Use the **rf-channel cable downstream channel-id** command to change the default channel ID.

The downstream channel ID that is assigned to the RF channel must be unique on the fiber node.

- The ID cannot be the same ID as is used for another RF channel on the fiber node.
- The ID cannot be the same ID as is used for a primary downstream channel on the fiber node.

You can check downstream channel IDs that are being used by examining the CMTS router configuration file.

Refer to **cable downstream channel-id** *id* command for the updated downstream channel ID scheme table.

**Note**

If you assign a downstream channel ID that is not unique on the fiber node, the **rf-channel cable downstream channel-id** command displays an error message. The command does assign the channel ID, but the status of the fiber node becomes invalid.

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command.

- For annex A and 256 QAM, each Wideband SPA supports 18 RF channels. In this case, valid values for the *rf-port* argument are 0 to 17.
- For all other cases, the SPA supports 24 RF channels. In these cases, valid values for the *rf-port* argument are 0 to 23.

**Note**

Effective with Cisco IOS Release 12.3(23)BC, the **annex modulation** command is obsolete and **annex** and **modulation** are included as keyword options in the **rf-channel frequency** command. Also, for annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels at full rate or up to 24 RF channels at less than full rate.

**Examples**

The following example shows how to assign a downstream channel ID of 123 to RF channel 3 on the Wideband SPA located in slot/subslot/bay 1/0/1.

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/1
Router(config-controller)# rf-channel 3 cable downstream channel-id 123
```

**Related Commands**

| Command                                               | Description                                                                    |
|-------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>annex modulation</b>                               | Sets the annex and modulation for the Wideband SPA.                            |
| <b>cable primary</b>                                  | Specifies that a wideband channel is a primary wideband channel.               |
| <b>cable rf-channel</b>                               | Associates an RF channel on a Wideband SPA with a wideband channel.            |
| <b>controller modular-cable</b>                       | Enters controller configuration mode to configure the Wideband SPA controller. |
| <b>ip-address (controller)</b>                        | Sets the IP address of the Wideband SPA FPGA.                                  |
| <b>modular-host subslot</b>                           | Specifies the modular-host line card.                                          |
| <b>rf-channel frequency</b>                           | Sets the frequency for each RF channel.                                        |
| <b>rf-channel ip-address<br/>mac-address udp-port</b> | Sets the IP address, MAC address and UDP port for each RF channel.             |
| <b>rf-channel network delay</b>                       | Specifies the CIN delay for each RF channel.                                   |
| <b>rf-channel description</b>                         | Specifies the description for each RF channel.                                 |



# rf-channel depi-tunnel

To bind the depi-tunnel, which inherits the configuration of the specified l2tp-class and depi-class, to an rf-channel on a shared port adapter (SPA), use the **rf-channel depi-tunnel** command in controller configuration mode. The **tsid** keyword is used to associate the logical rf-channel of the SPA to a physical quadrature amplitude modulation (QAM) on the radio frequency gateway (RFGW-10). To unbind the depi-tunnel, use the **no** form of this command.

**rf-channel** *rf-channel* **depi-tunnel** *depi-tunnel-name* **tsid** *id*

**no rf-channel** *rf-channel* **depi-tunnel** *depi-tunnel-name* [**tsid** *id*]

|                    |                         |                                                                                 |
|--------------------|-------------------------|---------------------------------------------------------------------------------|
| Syntax Description | <i>rf-channel</i>       | RF channel physical port on the Wideband SPA. The allowed range is from 0 to 3. |
|                    | <i>depi-tunnel-name</i> | Name of the DEPI tunnel.                                                        |
|                    | <b>tsid</b> <i>id</i>   | TS ID value.                                                                    |

**Command Default** This command has no default behavior or values.

**Command Modes** Global configuration (config)  
Subinterface configuration (config-subif)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCC    | This command was introduced. |

**Usage Guidelines** To configure DEPI on the M-CMTS, bind the depi-tunnel to an rf-channel on a SPA using the **rf-channel depi-tunnel** command in controller configuration mode. To associate the logical rf-channel on the SPA to a QAM on the RFGW, use the **tsid** keyword.

**Examples** The following example shows how to bind the depi-tunnel SPA0 to rf-channel 0 on a SPA and associate tsid 100 to the QAM:

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 depi-tunnel SPA0 tsid 100
```

| Related Commands | Command                                 | Description                                          |
|------------------|-----------------------------------------|------------------------------------------------------|
|                  | <b>controller<br/>modular-cable</b>     | Specifies the slot, bay, and port to be configured.  |
|                  | <b>show interface<br/>modular-cable</b> | Displays the DEPI information for the modular cable. |

# rf-channel description

To configure the description of an RF channel on a Wideband SPA, use the **rf-channel description** command in controller configuration mode. To remove an RF channel configuration, use the **no** form of this command.

**rf-channel** *rf-port* **description** *description*

**no rf-channel** *rf-port* **description** *description*

## Syntax Description

|                    |                                                                                                                                                                                                                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>rf-port</i>     | Specifies the RF channel physical port on the Wideband SPA FPGA. Allowed range is 0 to 23. Valid values for <i>rf-port</i> depend on the configuration set with the <b>annex modulation</b> command (see the Usage Guidelines section). |
| <b>description</b> | Specifies a description for the RF channel.                                                                                                                                                                                             |

## Command Default

No default RF channel configuration values are set for the description.

## Command Modes

Controller configuration (config-controller)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

## Usage Guidelines

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command. For annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels at full rate and up to 24 RF channels at less than full rate. For all other cases, the SPA supports 24 RF channels.



### Note

In Cisco IOS Release 12.3(21)BC, annex and modulation parameters were set globally for each SPA using the **annex modulation** command. Beginning in Cisco IOS Release 12.3(23)BC, annex and modulation values are set for each RF channel using the **rf-channel frequency** command. The **annex modulation** command is obsolete.

## Examples

The following example shows how to configure the description of the RF channel characteristics for RF port 0:

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 description Primary downstream channel
```

| Related Commands | Command                                    | Description                                                                    |
|------------------|--------------------------------------------|--------------------------------------------------------------------------------|
|                  | cable primary                              | Specifies that a wideband channel is a primary wideband channel.               |
|                  | <b>cable rf-channel</b>                    | Associates an RF channel on a Wideband SPA with a wideband channel.            |
|                  | <b>controller modular-cable</b>            | Enters controller configuration mode to configure the Wideband SPA controller. |
|                  | <b>ip-address (controller)</b>             | Sets the IP address of the Wideband SPA FPGA.                                  |
|                  | modular-host subslot                       | Specifies the modular-host line card for Wideband protocol operations.         |
|                  | rf-channel cable downstream channel-id     | Assigns a downstream channel ID to an RF channel.                              |
|                  | rf-channel frequency                       | Sets the frequency for each RF channel.                                        |
|                  | rf-channel ip-address mac-address udp-port | Sets the IP address, MAC address and UDP port for each RF channel.             |
|                  | rf-channel network delay                   | Configures the network delay for an RF channel.                                |

# rf-channel frequency

To configure the frequency of an RF channel on a wideband interface, use the **rf-channel frequency** command in controller configuration mode. To remove the frequency of an RF channel configuration, use the **no** form of this command.

## Cisco IOS Releases 12.3(21)BC and 12.2(33)SCA

**rf-channel rf-port frequency freq**

**no rf-channel rf-port frequency**

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCB

**rf-channel rf-port frequency freq [annex {A | B} modulation {64 | 256} [interleave-depth {8 | 12 | 16 | 32 | 64 | 128}]]**

**no rf-channel rf-port frequency**

| Syntax Description |                                                       |                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>rf-port</i>                                        | Specifies the RF channel physical port on the Wideband SPA FPGA. Allowed range is 0 to 23. Valid values for <i>rf-port</i> depend on the configuration set with the <b>annex modulation</b> command (see the Usage Guidelines section).                                                                                                                           |
|                    | <i>freq</i>                                           | Sets the center frequency for the RF channel. Allowed range is 55000000 to 1050000000 MHz.                                                                                                                                                                                                                                                                        |
|                    | <b>annex {A B}</b>                                    | Specifies the MPEG framing format for each RF channel: <ul style="list-style-type: none"> <li><b>A</b>—Annex A. The downstream is compatible with the European MPEG framing format specified in ITU-TJ.83 Annex A.</li> <li><b>B</b>—Annex B. The downstream is compatible with the North American MPEG framing format specified in ITU-TJ.83 Annex B.</li> </ul> |
|                    | <b>modulation {64 256}</b>                            | Specifies the modulation rate for each RF channel: <ul style="list-style-type: none"> <li><b>64</b>—64-QAM</li> <li><b>256</b>—256-QAM</li> </ul>                                                                                                                                                                                                                 |
|                    | <b>interleave-depth {8   12   16   32   64   128}</b> | Indicates the downstream interleave depth. The default value is 32.                                                                                                                                                                                                                                                                                               |

**Command Default** No default RF channel configuration values are set for frequency, annex, and modulation.

**Command Modes** Controller configuration (config-controller)

## Command History

| Release     | Modification                                                                                                                                                               |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                 |
| 12.3(23)BC  | The following keyword options were added: <ul style="list-style-type: none"> <li>• <b>annex</b></li> <li>• <b>modulation</b></li> <li>• <b>interleave-depth</b></li> </ul> |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. The <b>annex</b> , <b>modulation</b> , and <b>interleave-depth</b> keyword options are not supported.      |
| 12.2(33)SCB | The <b>annex</b> , <b>modulation</b> , and <b>interleave-depth</b> keyword options are supported.                                                                          |

## Usage Guidelines

**Cisco IOS Release 12.3(21)BC and Cisco IOS Release 12.2(33)SCA**

This command configures the frequency for an RF channel on a Wideband SPA.

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command. For annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels. For all other cases, the SPA supports up to 24 RF channels.

**Note**

In Cisco IOS 12.3(21)BC and 12.3(21a)BC3 releases, **annex** and **modulation** parameters were set globally for each SPA using the **annex modulation** command. Beginning in Cisco IOS Release 12.3(23)BC, annex and modulation values are set for each RF channel using the **rf-channel frequency** command. The **annex modulation** command is obsolete.

**Cisco IOS Releases 12.3(23)BC and 12.2(33)SCB**

This command configures the frequency for an RF channel on a Wideband SPA. The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels. For annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels at full rate. For all other cases, the SPA supports up to 24 RF channels.

For each RF channel, use the **rf-channel frequency** command in controller configuration mode to configure RF-channel characteristics. For Cisco IOS Release 12.3(21)BC, for each RF channel (*rf-port*), the frequency option *must be configured* with the **rf-channel frequency** command.

Uniqueness of frequency is required for all cable downstream channels on all cable interfaces and all Wideband SPAs on the CMTS.

**Note**

Be certain to verify that the RF channel values set with **rf-channel frequency** *match the values configured for the QAM outputs on the edge QAM device*. The frequency value must match. If the value does not match, the Wideband SPA will not successfully communicate with the edge QAM device.

**Cisco IOS Release 12.2(33)SCE**

In Cisco IOS Release 12.2(33)SCE and later, changing the frequency of a single RF channel in a controller will change the frequency of all RF channels in that controller. In the event of the frequency change, all DOCSIS 3.0 cable modems will start re-registering in downstream partial service mode (p-online).

**Examples**

The following example shows how to configure RF channel frequency for RF port 0:

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 frequency 699000000 annex A modulation 256
interleave-depth 64
```

**Related Commands**

| Command                                               | Description                                                                    |
|-------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>cable primary</b>                                  | Specifies that a wideband channel is a primary wideband channel.               |
| <b>controller modular-cable</b>                       | Enters controller configuration mode to configure the Wideband SPA controller. |
| <b>rf-channel description</b>                         | Specifies the description for each RF channel.                                 |
| <b>rf-channel ip-address<br/>mac-address udp-port</b> | Sets the IP address, MAC address and UDP port for each RF channel.             |
| <b>rf-channel network-delay</b>                       | Configure the network delay for an RF channel.                                 |

# rf-channel ip-address mac-address udp-port

To configure the IP address, MAC address, UDP port and DEPI remote ID of an RF channel on a Wideband SPA, use the **rf-channel ip-address mac-address udp-port** command in controller configuration mode. To remove the IP address, MAC address, UDP port and DEPI remote ID configuration of an RF channel, use the **no** form of this command.

## Cisco IOS Releases 12.3(21)BC and 12.2(33)SCA

**rf-channel** *rf-port* **ip-address** *ip-address* **mac-address** *mac-address* **udp-port** *portnum*

**no rf-channel** *rf-port* **ip-address** *ip-address* **mac-address** *mac-address* **udp-port** *portnum*

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCB

**rf-channel** *rf-port* **ip-address** *ip-address* **mac-address** *mac-address* [**udp-port** *portnum* | **depi-remote-id** *session-id*]

**no rf-channel** *rf-port* **ip-address** *ip-address* **mac-address** *mac-address* [**udp-port** *portnum* | **depi-remote-id** *session-id*]

| Syntax Description |  |                                                                                                                                                                                                                                         |
|--------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>rf-port</i>     |  | Specifies the RF channel physical port on the Wideband SPA FPGA. Allowed range is 0 to 23. Valid values for <i>rf-port</i> depend on the configuration set with the <b>annex modulation</b> command (see the Usage Guidelines section). |
| <i>ip-address</i>  |  | Specifies the IP address of the Gigabit Ethernet interface on the edge QAM device for this RF channel.                                                                                                                                  |
| <i>mac-address</i> |  | Specifies the MAC address of the next-hop interface or of the edge QAM device for this RF channel.                                                                                                                                      |
| <i>portnum</i>     |  | Specifies the UDP port number for the edge QAM device that will be used for this RF channel. Allowed range is 0 to 65535.                                                                                                               |
| <i>session-id</i>  |  | Specifies the DEPI remote session ID to be used for encapsulation of frames in DOCSIS-MPT mode.                                                                                                                                         |

**Command Default** No default RF channel configuration values are set.

**Command Modes** Controller configuration (config-controller)

| Command History | Release     | Modification                                                                                                               |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                                 |
|                 | 12.3(23)BC  | The <b>depi-remote-id</b> keyword option was added.                                                                        |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. The <b>depi-remote-id</b> keyword option is not supported. |
|                 | 12.2(33)SCB | The <b>depi-remote-id</b> keyword option is supported.                                                                     |



## Usage Guidelines

For each RF channel, use the **rf-channel ip-address mac-address udp-port** command in controller configuration mode to configure RF-channel characteristics.

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command. For annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels. For all other cases, the SPA supports up to 24 RF channels.



### Note

In the Cisco IOS Release 12.3(21)BC and 12.3(21a)BC3 releases, **annex** and **modulation** parameters were set globally for each SPA using the **annex modulation** command. Beginning in Cisco IOS Release 12.3(23)BC, annex and modulation values are set for each RF channel using the **rf-channel frequency** command. The **annex modulation** command is obsolete.

For each RF channel (*rf-port*), the following items *must be configured* with **rf-channel ip-address mac-address udp-port** command:

#### Cisco IOS Release 12.3(21)BC and Cisco IOS Release 12.2(33)SCA

- IP address
- MAC address
- UDP port
- Associated wideband channel (see the **cable rf-channel** command)

#### Cisco IOS Releases 12.3(23)BC and 12.2(33)SCB

- IP address
- MAC address
- UDP port or DEPI remote ID
- Associated wideband channel (see the **cable rf-channel** command)

The value used for *mac-address* in the *mac-address* argument is as follows:

- If a Gigabit Ethernet router or Layer 3 switch is used between the Wideband SPA and the edge QAM device, the value specified for *mac-address* is the MAC address for the next-hop interface on the router or Layer 3 switch.
- If a Gigabit Ethernet router or Layer 3 switch is not used, the value specified for *mac-address* is the MAC address for the Gigabit Ethernet interface on the edge QAM device.

The UDP port number set for the RF channel allows mapping an input UDP session to a specific QAM output port. Wideband traffic from different Wideband SPAs cannot be mixed on the same QAM output ports.



### Note

Be certain to verify that the RF channel values set with **rf-channel frequency** match the values configured for the QAM outputs on the edge QAM device. IP address, MAC address, UDP port, and DEPI remote ID must match. If any of these values do not match, the Wideband SPA will not successfully communicate with the edge QAM device.

## Examples

The following example shows how to configure the RF channel IP address, MAC address UDP port and DEPI remote ID characteristics for RF port 0:

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/0
```

**rf-channel ip-address mac-address udp-port**

```
Router(config-controller)# rf-channel 0 ip-address 192.168.200.30 mac-address
0011-920e-a9ff udp-port 49152
```

#### Related Commands

| Command                                       | Description                                                                    |
|-----------------------------------------------|--------------------------------------------------------------------------------|
| <b>cable primary</b>                          | Specifies that a wideband channel is a primary wideband channel.               |
| <b>cable rf-channel</b>                       | Associates an RF channel on a Wideband SPA with a wideband channel.            |
| <b>controller modular-cable</b>               | Enters controller configuration mode to configure the Wideband SPA controller. |
| <b>ip-address (controller)</b>                | Sets the IP address of the Wideband SPA FPGA.                                  |
| <b>modular-host sub-slot</b>                  | Specifies the modular-host line card for Wideband protocol operations.         |
| <b>rf-channel cable downstream channel-id</b> | Assigns a downstream channel ID to an RF channel.                              |
| <b>rf-channel description</b>                 | Specifies the description for each RF channel.                                 |
| <b>rf-channel frequency</b>                   | Sets the frequency for each RF channel.                                        |
| <b>rf-channel network delay</b>               | Configures the network delay for an RF channel.                                |

# rf-channel network-delay

To configure the network delay for an RF channel on a Wideband SPA, use the **rf-channel network delay** command in controller configuration mode. To remove the network delay configuration for an RF channel, use the **no** form of this command.

**rf-channel rf-port network-delay delay [sampling-rate rate]**

**no rf-channel rf-port network-delay delay [sampling-rate rate]**

## Syntax Description

|                      |                                                                                                                                                                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>rf-port</i>       | RF channel physical port on the Wideband SPA FPGA. The allowed range is from 0 to 23. The valid values for <i>rf-port</i> depend on the configuration set with the <b>annex modulation</b> command (see the Usage Guidelines section). |
| <i>delay</i>         | Converged Interconnect Network (CIN) delay. The default value is 550 us. The allowed range is from 0 to 3000 us. The <i>delay</i> value <b>auto</b> determines the delay through DEPI Latency Measurement (DLM) packets.               |
| <b>sampling-rate</b> | (Optional) Specifies how often the DLM is sent. The allowed range is from 1 to 500 sec. The default value is 10 sec. This option is available only when the <i>delay</i> value is set to auto.                                         |
| <i>rate</i>          | Sampling-rate value.                                                                                                                                                                                                                   |

## Command Default

No default RF channel network delay configuration values are set.

## Command Modes

Controller configuration (config-controller)

## Command History

| Release     | Modification                                                                                         |
|-------------|------------------------------------------------------------------------------------------------------|
| 12.3(23)BC  | This command was introduced for the Cisco uBR10012 universal broadband router.                       |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB.                                      |
| 12.2(33)SCC | This command was modified to include <b>sampling-rate rate</b> to specify how often the DLM is sent. |

## Usage Guidelines

The Cisco uBR10012 universal broadband router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command. For annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels. For all other cases, the SPA supports up to 24 RF channels.

**Note**

In Cisco IOS releases 12.3(21) BC and 12.3(21a)BC3, **annex** and **modulation** parameters were set globally for each SPA using the **annex modulation** command.

From Cisco IOS Release 12.3(23)BC onwards, annex and modulation values are set for each RF channel using the **rf-channel frequency** command. The **annex modulation** command is obsolete.

**Examples**

The following example shows how to configure the RF channel network delay characteristics for RF port 0:

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 network-delay 1000
```

The following example shows how to configure the RF channel network delay characteristics for RF port 0 with a sampling-rate of 1sec:

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 network-delay auto sampling-rate 1
```

**Related Commands**

| Command                                           | Description                                                                    |
|---------------------------------------------------|--------------------------------------------------------------------------------|
| <b>cable primary</b>                              | Specifies that a wideband channel is a primary wideband channel.               |
| <b>cable rf-channel</b>                           | Associates an RF channel on a Wideband SPA with a wideband channel.            |
| <b>controller modular-cable</b>                   | Enters controller configuration mode to configure the Wideband SPA controller. |
| <b>ip-address (controller)</b>                    | Sets the IP address of the Wideband SPA FPGA.                                  |
| <b>modular-host subslot</b>                       | Specifies the modular-host line card for Wideband protocol operations.         |
| <b>rf-channel cable downstream channel-id</b>     | Assigns a downstream channel ID to an RF channel.                              |
| <b>rf-channel description</b>                     | Specifies the description for each RF channel.                                 |
| <b>rf-channel frequency</b>                       | Sets the frequency for each RF channel.                                        |
| <b>rf-channel ip-address mac-address udp-port</b> | Sets the IP address, MAC address, and UDP port for each RF channel.            |

# rf-channel rf-power

To set the RF power output level on Cisco UBR-MC20X20V and Cisco uBR-MC88V cable interface line cards, use the **rf-channel rf-power** command in controller configuration mode. To reset the RF output power level to its default value, use the **no** form of this command.

**rf-channel** *rf-port* **rf-power** *power-level*

**no rf-channel** *rf-port* **rf-power** *power-level*

## Syntax Description

|                    |                                                                                                                                                                                              |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>rf-port</i>     | RF channel physical port on the Wideband SPA FPGA. The valid range is from 0 to 3. Valid values for <i>rf-port</i> depend on the configuration set with the <b>annex modulation</b> command. |
| <i>power-level</i> | Desired RF output power level in dBmV. The valid range is dependent on the cable interface line card. The format is XY.Z. By default, .Z is added as .0.                                     |

## Command Default

None

## Command Modes

Controller configuration (config-controller)

## Command History

| Release     | Modification                                                                                                                                         |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced.                                                                                                                         |
| 12.2(33)SCD | This command was modified to support configuration of the controller interface on Cisco uBR7246VXR and Cisco uBR7225VXR universal broadband routers. |

## Usage Guidelines

For the Cisco UBR-MC20X20V cable interface line card, all the channels within a controller must have the same RF power value. When the RF power value is changed on any one channel, the same value is applied to all the channels within the controller. The recommended RF power range depends on the mode of the upconverter. The mode of the upconverter is decided by the highest numbered channel that is enabled.



### Note

RF power value outside the recommended RF power range is accepted but is automatically adjusted. If the input value exceeds the recommended RF power range, it is adjusted to a value lower than the upper limit of the range and if it is less than the recommended range, it is adjusted to a value higher than the lower limit of the range. The RF power level can be configured in decimals too.

[Table 40](#) lists the recommended RF power range for different channel settings on the Cisco UBR-MC20X20V line card.

**Table 40** RF Power Range on the Cisco UBR-MC20X20V Line Card

| Upconverter Mode | Channel Setting                                                                                          | Recommended RF Power Range |
|------------------|----------------------------------------------------------------------------------------------------------|----------------------------|
| Single           | Only channel 0 is enabled                                                                                | 60.0 to 52.0 dBmV          |
| Dual             | Channel 0 is either enabled or disabled. Channel 1 is enabled. Channel 2 and channel 3 are disabled.     | 56.0 to 48.0 dBmV          |
| Triple           | Channel 0, and channel 1 are either enabled or disabled. Channel 2 is enabled and channel 3 is disabled. | 54.0 to 46.0 dBmV          |
| Quad             | Channels 0, 1, and 2 are either enabled or disabled. Channel 3 is enabled.                               | 52.0 to 44.0 dBmV          |

Table 41 lists the recommended RF power range for different channel settings on the Cisco uBR-MC88V line card.

**Table 41** RF Power Range on the Cisco uBR-MC88V Line Card

| Upconverter Mode | Channel Setting                                                                                                       | Recommended RF Power Range |
|------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------|
| Single           | The RF channel stacking number equals to 1 in this mode. Channel 0 is enabled while the other channels are disabled.  | 45 to 63 dBmV              |
| Dual             | The RF channel stacking number equals to 2 in this mode. Channels 0 and 1 are enabled; channels 2 and 3 are disabled. | 48 to 56 dBmV              |
| Triple           | The RF channel stacking number equals to 3 in this mode. Channels 0, 1, and 2 are enabled; channel 3 is disabled.     | 46 to 54 dBmV              |
| Quad             | The RF channel stacking number equals to 4. Channels 0, 1, 2, and 3 are enabled.                                      | 44 to 52 dBmV              |

## Examples

The following example shows how to configure RF power for RF port 0 in modular-cable controller mode:

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 rf-power 50.6
```

The following example shows how to configure RF power for RF port 0 in integrated-cable controller mode:

```
Router# configure terminal
```

```
Router(config)# controller integrated-cable 1/0/0
Router(config-controller)# rf-channel 0 rf-power 50.6
```

**Related Commands**

| Command                                               | Description                                                                    |
|-------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>cable primary</b>                                  | Specifies that a wideband channel is a primary wideband channel.               |
| <b>controller modular-cable</b>                       | Enters controller configuration mode to configure the Wideband SPA controller. |
| <b>controller integrated-cable</b>                    | Enters integrated-cable controller configuration mode.                         |
| <b>rf-channel description</b>                         | Specifies the description for each RF channel.                                 |
| <b>rf-channel ip-address<br/>mac-address udp-port</b> | Sets the IP address, MAC address and UDP port for each RF channel.             |
| <b>rf-channel frequency</b>                           | Configures the frequency for the RF channel.                                   |
| <b>rf-channel network-delay</b>                       | Configure the network delay for an RF channel.                                 |
| <b>rf-channel rf-shutdown</b>                         | Enables or disables RF output on a Wideband SPA.                               |

# rf-channel rf-shutdown

To disable the RF output on a wideband interface, use the **rf-channel rf-shutdown** command in controller configuration mode. To enable the RF output, use the **no** form of this command.

**rf-channel** *rf-port* **rf-shutdown**

**no rf-channel** *rf-port* **rf-shutdown**

|                           |                |                                                                                                                                                                                 |
|---------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>rf-port</i> | Specifies the RF channel physical port. Allowed range is from 0 to 3. Valid values for <i>rf-port</i> depend on the configuration set with the <b>annex modulation</b> command. |
|---------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                        |                        |
|------------------------|------------------------|
| <b>Command Default</b> | RF output is disabled. |
|------------------------|------------------------|

|                      |                                              |
|----------------------|----------------------------------------------|
| <b>Command Modes</b> | Controller configuration (config-controller) |
|----------------------|----------------------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCC    | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Starting with Cisco IOS Release 12.2(33)SCE, when you use the <b>rf-channel rf-shutdown</b> command, all DOCSIS 3.0 cable modems associated with the RF channel on a particular wideband interface will go offline and start re-registering in downstream partial service mode (p-online). In Cisco IOS Release 12.2(33)SCD and earlier, cable modems do not go offline while using the <b>rf-channel rf-shutdown</b> command. |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

For muting and unmuting the QAM on the Cisco RFGW-10, use the **rf-channel rf-shutdown** command in the M-CMTS.

|                 |                                                                    |
|-----------------|--------------------------------------------------------------------|
| <b>Examples</b> | The following example enables RF output on the Cisco wideband SPA: |
|-----------------|--------------------------------------------------------------------|

```
Router# enable
Router# configure terminal
Router(config)# controller integrated-cable 7/1/0
Router(config-controller)# no rf-channel 0 rf-shutdown
```

| <b>Related Commands</b> | <b>Command</b>                     | <b>Description</b>                                                             |
|-------------------------|------------------------------------|--------------------------------------------------------------------------------|
|                         | <b>controller modular-cable</b>    | Enters controller configuration mode to configure the Wideband SPA controller. |
|                         | <b>controller integrated-cable</b> | Enters integrated-cable controller configuration mode.                         |



| Command                         | Description                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------|
| <b>rf-channel network-delay</b> | Configure the network delay for an RF channel.                                      |
| <b>rf-channel rf-power</b>      | Sets the RF power output level on the Cisco UBR-MC20X20V cable interface line card. |

# rf-channel stacking

To suppress a carrier or mute a radio frequency (RF) channel on the Cisco uBR-MC88V cable interface line card, use the **rf-channel stacking** command in controller configuration mode. To remove the configuration, use the **no** form of this command.

**rf-channel stacking** *stacking-number*

**no rf-channel stacking** *stacking-number*

## Syntax Description

|                        |                                                                                     |
|------------------------|-------------------------------------------------------------------------------------|
| <i>stacking-number</i> | RF channel stacking number. The valid range is from 1 to 4. The default value is 4. |
|------------------------|-------------------------------------------------------------------------------------|

## Command Default

The RF channel stacking number is set to 4.

## Command Modes

Controller configuration (config-controller)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCD | This command was introduced. |

## Usage Guidelines

If you change the default stacking number configuration, traffic loss may occur on the active channels. For example, if you change the stacking number from 4 to 2, traffic is interrupted on the RF channels 0 and 1. However, traffic loss does not occur if you do not change the stacking number configuration when shutting down an RF channel using the **rf-channel rf-shutdown** command.



### Note

We recommend that you do not change the default stacking number configuration. You can change the default configuration when you want RF diagnostics performed on a particular channel. For example, if you want to perform RF diagnostics on RF channel 2, you need to change the default stacking number configuration to 2 to completely mute this channel.

## Examples

The following example shows how to configure the RF channel stacking number for the Cisco uBR-MC88V cable interface line card:

```
Router# configure terminal
Router(config)# controller integrated-cable 5/1
Router(config-controller)# rf-channel stacking 3
```

## Related Commands

| Command                       | Description                                                                     |
|-------------------------------|---------------------------------------------------------------------------------|
| <b>rf-channel rf-shutdown</b> | Disables the RF output on a Cisco Wideband SPA, or a cable interface line card. |

# rf-switch auxport enable

To enable the AUX port of the RF switch, use the **rf-switch auxport enable** command in redundancy mode. To disable the AUX port, use the **no** form of this command.

**rf-switch auxport enable**

**no rf-switch auxport**

| Syntax Description | enable | Enables the Cisco NGRFSW-ADV. In the default configuration, the Cisco NGRFSW-ADV is disabled. When the Cisco NGRFSW-ADV is enabled, the Cisco CMTS router starts polling the Cisco NGRFSW-ADV at a set interval to check its status. |
|--------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|--------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Command Default | The AUX port of the Cisco NGRFSW-ADV is disabled by default. |
|-----------------|--------------------------------------------------------------|
|-----------------|--------------------------------------------------------------|

| Command Modes | Redundancy mode (config-red) |
|---------------|------------------------------|
|---------------|------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

| Examples | The following example shows how to enable the AUX port of the Cisco NGRFSW-ADV: |
|----------|---------------------------------------------------------------------------------|
|----------|---------------------------------------------------------------------------------|

```
Router> enable
Router# configure terminal
Router(config)# redundancy
Router(config-red)# linecard-group 1 cable
Router(config-red-lc)# rf-switch auxport enable
```

| Associated Features | The <b>rf-switch auxport enable</b> command is used to configure the Cisco uBR Advanced RF Switch (NGRFSW-ADV). See <a href="#">Cisco uBR Advanced RF Switch Software Configuration Guide</a> . |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                               | Description                                                                                                                                                      |
|------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>linecard-group <i>id</i> cable</b> | Assigns the Hot Standby Connection-to-Connection Protocol (HCCP) group to all interfaces on the cable interface line card, or Cisco Broadband Processing Engine. |
|                  | <b>show redundancy linecard</b>       | Displays information about a redundant line card or line card group.                                                                                             |

## secondary aux

To enable the auxiliary port on the standby PRE1 module, use the **secondary aux** command in redundancy configuration (main-cpu) mode. To disable the auxiliary port, use the **no** form of this command.

**secondary aux**

**no secondary aux**

### Syntax Description

This command has no keywords or arguments.

### Command Default

The auxiliary port on the standby PRE1 module is disabled.

### Command Modes

Redundancy configuration, main-cpu mode

### Command History

| Release     | Modification                                               |
|-------------|------------------------------------------------------------|
| 12.2(11)BC3 | This command was introduced for the Cisco uBR10012 router. |

### Examples

The following example shows how to enable the auxiliary port on the standby PRE1 module.

```
Router# config t
Router(config)# redundancy
Router(config-r)# main-cpu
Router(config-r-mc)# secondary aux
Router(config-r-mc)# exit
Router(config-f)# exit
Router(config)#
```

### Related Commands

| Command                                   | Description                                                                                                                                                       |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>main-cpu</b>                           | Enters main-CPU redundancy configuration mode, so that you can configure the synchronization of the active and standby Performance Routing Engine (PRE1) modules. |
| <b>redundancy</b>                         | Configures the synchronization of system files between the active and standby PRE1 modules.                                                                       |
| <b>redundancy force-failover main-cpu</b> | Forces a manual switchover between the active and standby PRE1 modules.                                                                                           |

## service-class (cmts-tag)

To configure the specified service class name for the CMTS tag, use the **service-class** command in the cmts-tag configuration mode. To remove the configured service class name from the CMTS tag, use the **no** form of this command.

**[exclude] service-class** *service-class-name*

**no service-class** *service-class-name*

| Syntax Description | <b>exclude</b>            | (Optional) Configures the CMTS tag to exclude the specified service class name. |
|--------------------|---------------------------|---------------------------------------------------------------------------------|
|                    | <i>service-class-name</i> | Service class name with matching rule                                           |

| Command Default | No default behavior or values. |
|-----------------|--------------------------------|
|-----------------|--------------------------------|

| Command Modes | CMTS tag mode (cmts-tag) |
|---------------|--------------------------|
|---------------|--------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

| Examples | The following example shows how to configure the specified service class name for the CMTS tag using the <b>service-class</b> command: |
|----------|----------------------------------------------------------------------------------------------------------------------------------------|
|----------|----------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable tag 1
Router(cmts-tag)# service-class uBR
```

| Related Commands | Command                                     | Description                                                                                                              |
|------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable load-balance docsis-group</b>      | To configure a DOCSIS load balancing group on the CMTS.                                                                  |
|                  | <b>show cable load-balance docsis-group</b> | To display real-time configuration, statistical and operational information for load balancing operations on the router. |
|                  | <b>cable tag</b>                            | To configure a tag for a DOCSIS load balancing group on the CMTS.                                                        |

# service-class (enforce-rule)

To identify a particular service class for cable modem monitoring in an enforce-rule, use the **service-class (enforce-rule)** command in enforce-rule configuration mode. To remove the service class from the enforce-rule, use the **no** form of this command.

**service-class** { **enforced** | **registered** } *name*

**no service-class** { **enforced** | **registered** } *name*

## Syntax Description

|                   |                                                                       |
|-------------------|-----------------------------------------------------------------------|
| <b>enforced</b>   | Specifies an enforced service class.                                  |
| <b>registered</b> | Specifies enforcing of QoS profiles for the registered service class. |
| <i>name</i>       | Specifies the name of the service class.                              |

## Command Default

No default behavior or values

## Command Modes

Enforce-rule configuration (enforce-rule)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(9a)BC  | This command was introduced.                                                                                       |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The **service-class (enforce-rule)** command allows operators to identify the name of the initial registered service class for a CM in an enforce-rule, and also the name of a new service class to be enforced if the CM violates its registered service parameters.

## Examples

The following example shows specification of the enforced service class called “test” in an enforce-rule:

```
Router(enforce-rule) # service-class enforced test
```

## Related Commands

| Command                                  | Description                                                                                                                               |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos enforce-rule</b>            | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>debug cable subscriber-monitoring</b> | Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.                                         |
| <b>duration</b>                          | Specifies the time period and sample rate to be used for monitoring subscribers.                                                          |
| <b>enabled (enforce-rule)</b>            | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.                                                |

| Command                            | Description                                                                                        |
|------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>monitoring-basics</b>           | Specifies the type of monitoring desired for subscriber traffic management on a Cisco CMTS router. |
| <b>peak-time1</b>                  | Specifies peak and offpeak monitoring times on a Cisco CMTS router.                                |
| <b>qos-profile registered</b>      | Specifies the registered QoS profile that should be used for this enforce-rule.                    |
| <b>show cable qos enforce-rule</b> | Displays the QoS enforce-rules that are currently defined.                                         |
| <b>show cable subscriber-usage</b> | Displays subscribers who are violating their registered QoS profiles.                              |

# service divert-rate-limit



## Note

Effective with Cisco IOS Release 12.2(33)SCB, the **service divert-rate-limit** *fib-rp-glean* command is replaced on the WAN-side by the **service divert-rate-limit ip** *fib-rp-glean* command. See the **service divert-rate-limit ip** command for more information. The **service divert-rate-limit** *fib-rp-glean* command is replaced on the WAN-side non-IP by **service divert-rate-limit non-ip** *fib-rpf-glean* command. See the **service divert-rate-limit non-ip** command for more information. For cable-side DRL configuration, see the **cable divert-rate-limit** command.

To configure PXF Divert-Rate-Limit, use the **service divert-rate-limit** command in interface configuration mode. To reset this feature to the default parameters, use the **no** form of this command.

**service divert-rate-limit** *divert-code rate* [**limit** *limit*]

**no service divert-rate-limit** *divert-code*

## Syntax Description

|                           |                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>divert-code rate</i>   | Configures the PXF Divert-Rate-Limit for the any of the following packets: <ul style="list-style-type: none"> <li>• fwd-glean—Packets that hit a glean adjacency in the FIB.</li> <li>• rpf-glean—Packets that hit a glean adjacency during the RPF check.</li> </ul> The minimum rate is 1 packet-per-second and the maximum rate is 255 packets-per-second.<br>The default rate is 20 packets-per-second. |
| <b>limit</b> <i>limit</i> | (Optional) Sets the limit for the number of packets that will be diverted in an initial burst of packets.<br>The minimum limit is 4 packets and the maximum limit is 255 packets.<br>The default limit is 5 packets.                                                                                                                                                                                        |



## Note

Setting the limit has a limited effect on the behavior of the algorithm, so this part of the CLI is hidden.

## Defaults

Divert-Rate-Limit contains the following default behavior and values:

- Divert-Rate-Limit is always active.
- The default rate is 20 packets-per-second.
- The default limit is 5 packets.

## Command Modes

Interface configuration—cable interface only (config-if)



**Command History**

|             |                                                                                                                                                              |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC | The command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers.                                                          |
| 12.2(33)SCA | This command was integrated into Cisco IOS release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                           |
| 12.2(33)SCB | This command was replaced by the <b>service divert-rate-limit ip fib-rp-glean</b> command and <b>service divert-rate-limit non-ip fib-rpf-glean</b> command. |

**Usage Guidelines**

The **service divert-rate-limit** command is used to configure the PXF Divert-Rate-Limit for fwd-glean and rpf-glean packets in order to identify packet streams that will cause congestion of the FP-to-RP interface.

**Examples**

The following example shows how to configure rate-limiting for fib-rp-glean, with a rate of 10 packets-per-second and a limit of 20 packets:

```
Router(config-if)# service divert-rate-limit fib-rp-glean 10 limit 20
```

The following example shows how to return rate-limiting for fib-rp-glean to the default values:

```
Router(config-if)# no service divert-rate-limit fib-rp-glean
```

Pass and fail counters are kept for fwd-glean, rpf-glean, and cable-ARP packets. To show the statistics for the pass and fail counter, use the **show pxf cpu statistics drl** command:

```
Router(config-if)# show pxf cpu statistics drl
Divert-Rate-Limit statistics
 code total diverted dropped
 fib_rpf_glean 500 59 441
 fib_rp_glean 500 54 446
 arp_filter 0 0 0
```

**Note**

The arp\_filter stats shown above are global stats for PXF ARP Filtering. These stats cannot be cleared by the CLI. However, they will reset to zero upon reload.

Packets dropped by Divert-Rate-Limit and the ARP Filter will be recorded in the regular PXF drop statistics:

```
Router(config-if)# show pxf cpu statistics drop c5/0/0
FP drop statistics for Cable5/0/0
 packets bytes
 vcci undefined 0 0
 vcci C
 ...
 divert_rate_limit 441 28224
 arp_filter_reply 0 0
 arp_filter_request 0 0
```

**Related Commands**

| Command                      | Description                                                               |
|------------------------------|---------------------------------------------------------------------------|
| <b>show cable arp-filter</b> | Displays the total number of Address Resolution Protocol (ARP) offenders. |

## service divert-rate-limit ip

To set DRL rate and limit for WAN-side IP packet streams, use the **service divert-rate-limit ip** command in global configuration mode. To reset the *rate* and *limit* to the default values for all IP divert-codes, use the **no** form of this command. Using **no service divert-rate-limit ip divert-code** will reset *rate* and *limit* to the default values for the specified divert code.

**service divert-rate-limit ip divert-code rate rate limit limit**

**no service divert-rate-limit ip**

|                           |                    |                                                                                                                                           |
|---------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>divert code</i> | Specifies the applicable divert code.                                                                                                     |
|                           | <i>rate</i>        | Specifies the divert rate in packets per second. Minimum rate is 1 packet per second. Maximum rate is 65535 packets per second.           |
|                           |                    | For WAN-side IP packets, the default rate is 4000 packets per second                                                                      |
|                           | <i>limit</i>       | Specifies the number of packets to be diverted in an initial burst of packets. Minimum limit is 4 packets. Maximum limit is 4194 packets. |
|                           |                    | For WAN-side IP packets, the default limit is 4000 packets.                                                                               |

|                        |                                                                                                                                                                                   |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | For WAN-side IP packet streams, the default rate is 4000 packets per second and default limit is 4000 packets. These defaults apply to each uniquely identified IP packet stream. |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

|                        |                |                                                                                                                                                         |
|------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                     |
|                        | 12.2(33)SCB    | This command was introduced.                                                                                                                            |
|                        |                | The <b>service divert-rate-limit ip fib-rp-glean</b> command is the WAN-side replacement for the <b>service divert-rate limit fib-rp-glean</b> command. |

|                         |                                                                                                                                                                                                                                                                                                                              |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | You can configure a rate and limit for a particular IP divert-code for WAN-side IP packets. However, each IP packet-stream is uniquely identified (using a hash of the VRF, the IP source address, and the divert-code), and then packets in that stream are sent through a rate-limiter with the configured rate and limit. |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to set the rate and limit for the specified divert code: |
|-----------------|------------------------------------------------------------------------------------------|

```
Router(config)# service divert-rate-limit ip fib-rp-glean rate 1 limit 4
```

### Related Commands

| Command                                               | Description                                                     |
|-------------------------------------------------------|-----------------------------------------------------------------|
| <b>service<br/>divert-rate-limit<br/>non-ip</b>       | This command configures DRL for WAN-side non-IP packet streams. |
| <b>service<br/>divert-rate-limit<br/>trusted-site</b> | This command adds entries to the trusted site list.             |

## service divert-rate-limit ipv6

To set the divert rate limit (DRL) rate and limit for WAN-side IPv6 packet streams, use the **service divert-rate-limit ipv6** command in global configuration mode.

**service divert-rate-limit ipv6** *divert-code* **rate** *rate* **limit** *limit*

**no service divert-rate-limit ipv6**

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>divert-code</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Specifies the applicable divert code.                                                                                                                                                                          |
|                           | <i>rate</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Specifies the divert rate in packets per second. Minimum rate is 1 packet per second. Maximum rate is 65535 packets per second.<br><br>For WAN-side IPv6 packets, the default rate is 4000 packets per second. |
|                           | <i>limit</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Specifies the number of packets to be diverted in an initial burst of packets. Minimum limit is 4 packets. Maximum limit is 4194 packets.<br><br>For WAN-side IPv6 packets, the default limit is 4000 packets. |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                |
| <b>Command Default</b>    | For WAN-side IPv6 packet streams, the default rate is 4000 packets per second and default limit is 4000 packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                |
| <b>Command Modes</b>      | Global configuration (config)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                |
| <b>Command History</b>    | <b>Release</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Modification</b>                                                                                                                                                                                            |
|                           | 12.2(33)SCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | This command was introduced.                                                                                                                                                                                   |
| <b>Usage Guidelines</b>   | <p>You can configure rate and limit for a particular IPv6 divert-code for WAN-side IP packets. However, each IP packet-stream is uniquely identified (using a hash of the VRF, the IP source address, and the divert-code), and then packets in that stream are sent through a rate-limiter with the configured rate and limit.</p> <p>This command is supported only on PRE4.</p> <p>Use the <b>diversion</b> option of the <b>show pxf cpu statistics</b> command to troubleshoot the divert code, before configuring the DRL.</p> <p>To configure the correct divert code, refer to the list of divert codes.</p> |                                                                                                                                                                                                                |

**Table 42 List of divert codes**

| Divert Code       | Description       |
|-------------------|-------------------|
| 6pe_dst_linklocal | 6PE dst linklocal |
| 6pe_dst_mcast     | 6PE dst multicast |
| 6pe_ttl           | 6PE ttl           |
| icmpv6            | IPv6 ICMP         |

| Divert Code          | Description                     |
|----------------------|---------------------------------|
| ipv6_cable_filter_ds | ipv6 cable filter ds            |
| ipv6_dhcp_unicast    | IPv6 unicast DHCP               |
| ipv6_hopopts         | IPv6 HopOpts                    |
| ipv6_lng_ext_hdr     | IPv6 long extension hdr         |
| ipv6_mcast_rsvd      | IPv6 multicast                  |
| ipv6_nd_na_mcast     | IPv6 ND NA (multicast)          |
| ipv6_nd_na_unicast   | IPv6 ND NA (unicast)            |
| ipv6_nd_ns_mcast     | IPv6 ND NS (multicast)          |
| ipv6_nd_ns_unicast   | IPv6 ND NS (unicast)            |
| ipv6_nd_rs_mcast     | IPv6 ND RS (multicast)          |
| ipv6_rp_dest         | IPv6 receive adjacency          |
| ipv6_rp_glean        | IPv6 glean adjacency            |
| ipv6_rp_pbr          | IPv6 RP PBR                     |
| ipv6_rp_punt         | IPv6 punt adjacency             |
| ipv6_src_linklocal   | IPv6 SRC LinkLocal              |
| ipv6_src_ver_lq_req  | IPv6 src ver leasequery request |
| ipv6_src_ver_mac_req | IPv6 src ver MAC request        |

**Note**

To reset the *rate* and *limit* to the default values for all IPv6 divert-codes, use the **no** form of this command. Using **no service divert-rate-limit ipv6 *divert-code*** will reset *rate* and *limit* to the default values for the specified divert code.

**Examples**

The following example shows how to set the rate and limit for the specified divert code:

```
Router(config)# service divert-rate-limit ipv6 ipv6_rp_glean rate 20 limit 10
Router(config)#
```

**Related Commands**

| Command                                            | Description                                                |
|----------------------------------------------------|------------------------------------------------------------|
| <b>service divert-rate-limit trusted-site</b>      | Adds IPv4-specific entries to the trusted site list.       |
| <b>service divert-rate-limit non-ip</b>            | Configures DRL for WAN-side non-IP packet streams.         |
| <b>service divert-rate-limit trusted-site-ipv6</b> | Adds IPv6-specific entries to the trusted site list.       |
| <b>show pxf cpu statistics</b>                     | Displays Parallel eXpress Forwarding (PXF) CPU statistics. |

# service divert-rate-limit ip trusted-site

To add entries to the trusted site list, use the **service divert-rate-limit ip trusted-site** command in the global configuration mode. To remove all entries from the trusted site list, use the **no** form of this command.

**service divert-rate-limit ip trusted-site** *ip-address* **mask** *ip-address* **tos** *tos-value* **mask** *tos-mask* **vrf** *vrf-name*

**no service divert-rate-limit ip trusted-site** *ip-address* **mask** *ip-address* **tos** *tos-value* **mask** *tos-mask* **vrf** *vrf-name*

|                    |                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>ip-address</i>                                                                                                           | Specifies the source IP address that should be matched.<br>Example: 64.12.13.0                                                                                                                                                                                                                                                                                                                                                                              |
|                    | <b>mask</b> <i>ip-address</i>                                                                                               | The mask to apply to the source IP address of the packet before testing if it matches. There are no restrictions on the mask value.<br>Example: 255.255.0.255                                                                                                                                                                                                                                                                                               |
|                    | <b>tos</b> <i>tos-value</i>                                                                                                 | The ToS value of the trusted site. There are no restrictions on the <i>tos_value</i> .<br>Example: 0xD0                                                                                                                                                                                                                                                                                                                                                     |
|                    | <b>mask</b> <i>tos-mask</i>                                                                                                 | The mask to apply to the IP ToS value and the trusted-site <i>tos_value</i> before testing if it matches. There are no restrictions on the <i>tos_mask</i> value.<br>Example: 0xF3                                                                                                                                                                                                                                                                          |
|                    | <div> <div></div> <div>Note</div> <div>The ToS value can be wild-carded by setting the <i>tos_mask</i> to 0x00</div> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                    | <b>vrf</b> <i>vrf-name</i>                                                                                                  | <p>The VRF that this trusted site applies to.</p> <p>For the global VRF, use the <b>global</b> keyword. To apply the trusted-site to all VRFs (including the global VRF), hit enter after specifying the <i>tos-mask</i>.</p> <p>If a non-existent VRF is specified, the table entry is filled, but the information is not written to toaster memory. If the specified VRF is subsequently created, the information is written to toaster at that time.</p> |

**Command Default** No default behavior or values.

**Command Modes** Global configuration (config)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCB    | This command was introduced. |

---

**Usage Guidelines**

The **service divert-rate-limit ip trusted-site** command is used to configure trusted site list that contains a source IP address and mask, IP ToS value and mask, and a VRF. If no IP address is specified, the entire trusted site list is cleared. The trusted site list contains a source IP address and mask, IP ToS value and mask, and a VRF. The trusted site list applies only to WAN-IP IPv4 packets. There is a limitation of four trusted sites.

---

**Examples**

The following example shows how to configure trusted site list:

```
Router(config)# service divert-rate-limit trusted-site 64.12.13.0 255.255.0.255
 tos 0xD0 mask 0xF3 vrf name1
```

---

**Related Commands**

| Command                                         | Description                                                               |
|-------------------------------------------------|---------------------------------------------------------------------------|
| <b>service<br/>divert-rate-limit<br/>non-ip</b> | This command sets and limit default values for the specified divert code. |

## service divert-rate-limit trusted-site-ipv6

To add IPv6-specific entries to the trusted site list, use the **service divert-rate-limit trusted-site-ipv6** command in the global configuration mode. To remove all entries from the trusted site list, use the **no** form of this command.

**service divert-rate-limit trusted-site-ipv6** *ip-address* **traffic-class** *tc\_value* **mask** *tc-mask* [**global** | **vrf** *vrf-name*]

**no service divert-rate-limit trusted-site-ipv6**

| Syntax Description |                                      |                                                                                                                                                                                                                                                                      |
|--------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>ip-address</i>                    | The source IPv6 address that should be matched.                                                                                                                                                                                                                      |
|                    | <b>traffic-class</b> <i>tc_value</i> | The 8-bit traffic-class of the trusted site. There are no restrictions on the <i>tc_value</i> . Example: 0xD0                                                                                                                                                        |
|                    | <b>mask</b> <i>tc-mask</i>           | The mask to apply to the packet traffic-class and the trusted-site <i>tc_value</i> before testing if it matches. There are no restrictions on the <i>tc_mask</i> value. Example: 0xF3                                                                                |
|                    | <b>vrf</b> <i>vrf-name</i>           | The virtual route forwarding (VRF) instance to which this trusted site is being applied.<br><br>For the global VRF, use the <b>global</b> keyword. To apply the trusted-site to all VRFs (including the global VRF), hit enter after specifying the <i>tc-mask</i> . |

**Command Default** Disabled

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

**Usage Guidelines** This command is used to configure trusted site list that contains an IPv6 source-address/prefix-length, a traffic-class value & mask, and a VRF. There is a limitation of four trusted sites.



### Note

The **no** form of the command is used to remove all entries from the trusted site list. To remove a specific entry you should specify the matching source IP address. For example: **no service divert-rate-limit trusted-site-ipv6** *ip-address* **traffic-class** *tc\_value* **mask** *tc-mask* [**global** | **vrf** *vrf-name*].

**Examples** The following example shows how to configure IPv6 trusted site list:

```
Router(config)# service divert-rate-limit trusted-site-ipv6
2001:420:3800:800:21F:29FF::1/128 traffic-class 0x3 mask 0xFF global
Router(config)#
```



| Related Commands | Command                                         | Description                                                                   |
|------------------|-------------------------------------------------|-------------------------------------------------------------------------------|
|                  | <b>show pxf cpu statistics<br/>drl us-cable</b> | Displays the number of upstream cable packets that are dropped from the CMTS. |
|                  | <b>show pxf cpu statistics<br/>drl ipv6</b>     | Verifies the drop counters for WAN-IPv6 packets.                              |
|                  | <b>show pxf cpu statistics<br/>drl ipv4</b>     | Verifies the drop counters for WAN-IPv4 packets.                              |

## service divert-rate-limit non-ip

To set DRL for WAN-side non-IP packet streams, use the **service divert-rate-limit non-ip** command in global configuration mode. To reset the *rate* and *limit* to the default values for all non-IP divert-codes, use the **no** form of this command. Using **no service divert-rate-limit non-ip divert-code** will reset *rate* and *limit* to the default values for the specified divert-code.

**service divert-rate-limit non-ip divert-code rate rate limit limit**

**no service divert-rate-limit non-ip**

|                           |                    |                                                                                                                                                                                                                  |
|---------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>divert-code</i> | Specifies the applicable divert code.                                                                                                                                                                            |
|                           | <i>rate</i>        | Specifies the rate in packets per second. Minimum rate is one packet per second. Maximum rate is 65535 packets per second.<br><br>For WAN-side non-IP packets, the default rate is 2000 packets per second.      |
|                           | <i>limit</i>       | Specifies the number of packets to be diverted in an initial burst of packets. Minimum limit is 4 packets. Maximum limit is 4194 packets.<br><br>For WAN-side non-IP packets, the default limit is 2000 packets. |

|                        |                                                                                                             |
|------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Command Default</b> | For WAN-side non-IP packets, the default rate is 2000 packets per second and default limit is 2000 packets. |
|------------------------|-------------------------------------------------------------------------------------------------------------|

|                      |                               |
|----------------------|-------------------------------|
| <b>Command Modes</b> | Global configuration (config) |
|----------------------|-------------------------------|

|                        |                |                                                                                                                                                                                                          |
|------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                      |
|                        | 12.2(33)SCB    | This command was introduced.<br><br>The <b>service divert-rate-limit non-ip fib-rpf-glean</b> command is the WAN-side non-IP replacement for the <b>service divert-rate limit fib-rpf-glean</b> command. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | You can configure a rate and limit for a particular non-IP divert-code, and all packets arriving with that divert-code are sent through a single rate-limiter with the configured rate and limit. but the explanation is fairly straightforward: there is a single rate-limiter for each non-IP divert-code. No attempt is made to uniquely identify the source of the attacking packet stream. |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                |
|-----------------|------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to set and limit default values for the specified divert code: |
|-----------------|------------------------------------------------------------------------------------------------|

```
Router(config)# service divert-rate-limit non-ip fib-rpf-glean rate 5 limit 25
```

### Related Commands

| Command                                 | Description                                                                |
|-----------------------------------------|----------------------------------------------------------------------------|
| <b>service<br/>divert-rate-limit ip</b> | This command configures DRL rate and limit for WAN-side IP packet streams. |

# service divert-rate-limit trusted-site

To add entries to the trusted site list, use the **service divert-rate-limit trusted-site** command in the global configuration mode. To remove all entries from the trusted site list, use the **no** form of this command.

```

service divert-rate-limit trusted-site ip-address mask-ip-address tos tos-value mask tos-mask
 [global | vrf vrf-name]

no service divert-rate-limit trusted-site

```

|                    |                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>ip-address</i>                                                                                                                                                                     | Specifies the source IP address that should be matched.<br><br>Example: 64.12.13.0                                                                                                                                                                                                                                                                                                                                                                    |
|                    | <b>mask</b> <i>ip-address</i>                                                                                                                                                         | The mask to apply to the source IP address of the packet before testing if it matches. There are no restrictions on the mask value.<br><br>Example: 255.255.0.255                                                                                                                                                                                                                                                                                     |
|                    | <b>tos</b> <i>tos-value</i>                                                                                                                                                           | The ToS value of the trusted site. There are no restrictions on the tos_value.<br>Example: 0xD0                                                                                                                                                                                                                                                                                                                                                       |
|                    | <b>mask</b> <i>tos-mask</i>                                                                                                                                                           | The mask to apply to the IP ToS value and the trusted-site tos_value before testing if it matches. There are no restrictions on the tos_mask value.<br><br>Example: 0xF3                                                                                                                                                                                                                                                                              |
|                    | <div>  <b>Note</b> The ToS value can be wild-carded by setting the tos_mask to 0x00         </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                    | <b>vrf</b> <i>vrf-name</i>                                                                                                                                                            | The VRF that this trusted site applies to.<br><br>For the global VRF, use the <b>global</b> keyword. To apply the trusted-site to all VRFs (including the global VRF), hit enter after specifying the <i>tos-mask</i> .<br><br>If a non-existent VRF is specified, the table entry is filled, but the information is not written to toaster memory. If the specified VRF is subsequently created, the information is written to toaster at that time. |

**Command Default** No default behavior or values.

**Command Modes** Global configuration (config)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCB    | This command was introduced. |

### Usage Guidelines

The **service divert-rate-limit ip trusted-site** command is used to configure trusted site list that contains a source IP address and mask, IP ToS value and mask, and a VRF. The trusted site list contains a source IP address and mask, IP ToS value and mask, and a VRF. The trusted site list applies only to WAN-IP IPv4 packets. There is a limitation of four trusted sites.

To remove specified entry from the trusted site list, use **no service divert-rate-limit trusted-site ip-address mask ip-address tos tos-value mask tos-mask [global | vrf vrf-name]**. If no IP address is specified, the entire trusted site list is cleared.

### Examples

The following example shows how to configure trusted site list:

```
Router(config)# service divert-rate-limit trusted-site 64.12.13.0 255.255.0.255
tos 0xD0 mask 0xF3 vrf name1
```

### Related Commands

| Command                                 | Description                                                               |
|-----------------------------------------|---------------------------------------------------------------------------|
| <b>service divert-rate-limit non-ip</b> | This command sets and limit default values for the specified divert code. |

# service instance

To configure an Ethernet service instance, use the **service instance** command in Layer 2 VPN configuration mode. To disable this configuration, use the **no** form of this command.

```
service instance id service-type

no service instance id service-type
```

| Syntax Description               | <table><tr><td>id</td><td>Service instance ID.</td></tr><tr><td>service-type</td><td>Service type for the instance.</td></tr></table>                                                                                                                           | id      | Service instance ID. | service-type                     | Service type for the instance.                                  |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------|----------------------------------|-----------------------------------------------------------------|
| id                               | Service instance ID.                                                                                                                                                                                                                                            |         |                      |                                  |                                                                 |
| service-type                     | Service type for the instance.                                                                                                                                                                                                                                  |         |                      |                                  |                                                                 |
| Command Default                  | None                                                                                                                                                                                                                                                            |         |                      |                                  |                                                                 |
| Command Modes                    | Layer 2 VPN configuration (config-l2vpn)                                                                                                                                                                                                                        |         |                      |                                  |                                                                 |
| Command History                  | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>12.2(33)SCC</td><td>This command was introduced in Cisco IOS Release 12.2(33)SCC.</td></tr></table>                                                                                                | Release | Modification         | 12.2(33)SCC                      | This command was introduced in Cisco IOS Release 12.2(33)SCC.   |
| Release                          | Modification                                                                                                                                                                                                                                                    |         |                      |                                  |                                                                 |
| 12.2(33)SCC                      | This command was introduced in Cisco IOS Release 12.2(33)SCC.                                                                                                                                                                                                   |         |                      |                                  |                                                                 |
| Usage Guidelines                 | You must provision a Multiprotocol Label Switching (MPLS) pseudowire before configuring an Ethernet service instance in Layer 2 VPN configuration mode.                                                                                                         |         |                      |                                  |                                                                 |
| Examples                         | <p>The following example shows how to configure an Ethernet service instance on a Cisco uBR10012 router:</p> <pre>Router # configure terminal Router(config) # cable l2vpn 001e.6bfb.0f9e customer2 Router(config-l2vpn) # service instance 7000 ethernet</pre> |         |                      |                                  |                                                                 |
| Related Commands                 | <table><tr><th>Command</th><th>Description</th></tr><tr><td>cable l2-vpn-service<br/>xconnect</td><td>Enables the use of Layer 2 tunnels based on an MPLS pseudowire.</td></tr></table>                                                                         | Command | Description          | cable l2-vpn-service<br>xconnect | Enables the use of Layer 2 tunnels based on an MPLS pseudowire. |
| Command                          | Description                                                                                                                                                                                                                                                     |         |                      |                                  |                                                                 |
| cable l2-vpn-service<br>xconnect | Enables the use of Layer 2 tunnels based on an MPLS pseudowire.                                                                                                                                                                                                 |         |                      |                                  |                                                                 |

# service udp-small-servers max-servers no-limit

To enable use of minor servers that use the UDP protocol (such as ToD, echo, chargen, and discard), use the **service udp-small-servers max-servers no-limit** command in global configuration mode. To remove this configuration, use the **no** form of this command.

**service udp-small-servers max-servers no-limit**

**no service udp-small-servers max-servers no-limit**

**Command Default** DHCP or ToD servers are not configured by default.

**Command Modes** Global configuration

| Command History | Release | Modification                                  |
|-----------------|---------|-----------------------------------------------|
|                 | 12.1 EC | Command support introduced on the Cisco CMTS. |

**Usage Guidelines** Disabling the ping option can speed up address assignment when a large number of modems are trying to connect at the same time. However, disabling the ping option can also result in duplicate IP addresses being assigned if users assign unauthorized static IP addresses to their CPE devices.

**Examples** The following example illustrates configuration of this command:

```
Router# configure terminal
Router(config)# service udp-small-servers max-servers no-limit
Router(config)#
```

The following example shows a typical ToD server configuration:

```
service udp-small-servers max-servers no-limit
cable time-server
```

These are the only commands required to enable the ToD server.

**Usage Guidelines** The **max-servers no-limit** option allows a large number of cable modems to obtain the ToD server at one time, in the event that a cable or power failure forces many cable modems offline. When the problem has been resolved, the cable modems can quickly reconnect.



**Note**

Do not disable the minor UDP servers if you are also enabling the other DHCP or TFTP servers.

For additional information about DHCP configuration on the Cisco CMTS, refer to the following documents on Cisco.com:

- *Filtering Cable DHCP Lease Queries on the Cisco CMTS*
- *DHCP and Time-of-Day Services on the Cisco CMTS*

| Related Commands | Command                                 | Description                                                                                                                                                                                                        |
|------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dhcp-giaddr policy</b>         | Sets the DHCP <i>giaddr</i> field of DHCP request packets to the primary address for cable modems and the secondary address for CPE devices, allowing the use of separate address pools for the different clients. |
|                  | <b>cable dhcp-parse option</b>          | Enables the parsing of certain DHCP options.                                                                                                                                                                       |
|                  | <b>cable helper-address</b>             | Enables load-balancing of DHCP requests from cable modems and CPE devices by specifying different DHCP servers according to the cable interface or subinterface.                                                   |
|                  | <b>ip dhcp ping packet 0</b>            | Instructs the DHCP server to assign an IP address from its pool without first sending an ICMP ping to test whether a client is already currently using that IP address.                                            |
|                  | <b>ip dhcp relay information option</b> | Configures the DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.                                                                                                         |
|                  | <b>ip dhcp smart-relay</b>              | Enables the DHCP relay agent on the CMTS to automatically switch a cable modem or CPE device to a secondary DHCP server or address pool if the primary DHCP server does not respond to three successive requests.  |



# service-class

To create a DOCSIS configuration file that specifies the quality-of-service (QoS) service-class options for the CM configuration file, use the **service-class** command in cable config-file configuration mode. To disable the specification, use the **no** form of this command.

```
service-class class { guaranteed-upstream us-bandwidth max-burst burst-size max-downstream
max-dsbandwidth max-upstream max-usbandwidth priority priority-num privacy }
```

```
no service-class
```

| Syntax Description |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>class</i>                                      | Specifies service class number. Valid range is 1 to 16. Default value is 1.                                                                                                                                                                                                                                                                                                                                                                                                 |
|                    | <b>guaranteed-upstream</b><br><i>us-bandwidth</i> | Specifies the guaranteed upstream bandwidth in kbps. Valid range for <i>us-bandwidth</i> is 0 to 100000 kbps. Default value is 0.                                                                                                                                                                                                                                                                                                                                           |
|                    | <b>max-burst</b> <i>burst-size</i>                | Specifies the maximum upstream burst size in bytes. Valid range for <i>burst-size</i> is 0 to 65535. Default value is 0, unlimited burst length. Recommended value range is 1600 to 1800 bytes. Using a value of 0 or greater than 1800 bytes can cause latency issues for Voice-over-IP. A value of less than 1500 bytes prevents upstream transmission of large Ethernet frames for any modem or CMTS not implementing fragmentation (an optional feature in DOCSIS 1.0). |
|                    | <b>max-downstream</b><br><i>max-dsbandwidth</i>   | Specifies the downstream bandwidth in kbps. Valid range for <i>max-dsbandwidth</i> is 0 to 100000 kbps. Default value is 0.                                                                                                                                                                                                                                                                                                                                                 |
|                    | <b>max-upstream</b><br><i>max-usbandwidth</i>     | Specifies the upstream bandwidth in kbps. Valid range for <i>max-usbandwidth</i> is 0 to 100000 kbps. Default value is 0.                                                                                                                                                                                                                                                                                                                                                   |
|                    | <b>priority</b> <i>priority-num</i>               | Specifies the service class priority. Valid range for <i>priority-num</i> is 0 to 7, where 7 is the highest-priority service-class setting.                                                                                                                                                                                                                                                                                                                                 |
|                    | <b>privacy</b>                                    | Enables baseline privacy interface (BPI).                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Command Default | Service-class is not set by default. A CM cannot register on a Cisco CMTS unless at least one parameter in a service class is specified. |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------|
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------|

| Command Modes | Cable config-file (config-file) |
|---------------|---------------------------------|
|---------------|---------------------------------|

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(2)EC1  | This command was introduced.                                                                                       |
|                 | 12.2(4)BC1  | This command was integrated into Cisco IOS Release 12.2(4)BC1.                                                     |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

Default values can be used only if **service-class** *class* is specified. A single configuration file should not contain multiple service-class ID numbers. Thus, all parameters should be set using a single service-class ID. However, different configuration files can reuse the same service-class ID.

**Note**

To enable Baseline Privacy Interface (BPI) operations on the cable command, you must specify both the **service-class privacy** and **privacy** commands for the cable modem's DOCSIS configuration file.

**Examples**

The following example shows how to specify the **service-class** command for a DOCSIS configuration file:

```
router(config)# cable config-file upgrade.cm
router(config-file)# service-class 1 priority 0
router(config-file)# service-class 1 max-upstream 3247
router(config-file)# service-class 1 max-downstream 10000
router(config-file)# service-class 1 max-burst 1600
router(config-file)# service-class 1 privacy
router(config-file)# privacy
router(config-file)# exit
```

**Related Commands**

| Command                  | Description                                                                 |
|--------------------------|-----------------------------------------------------------------------------|
| <b>cable config-file</b> | Creates a DOCSIS configuration file and enters configuration file mode.     |
| <b>access-denied</b>     | Disables access to the network.                                             |
| <b>channel-id</b>        | Specifies upstream channel ID.                                              |
| <b>cpe max</b>           | Specifies CPE information.                                                  |
| <b>download</b>          | Specifies download information for the configuration file.                  |
| <b>frequency</b>         | Specifies downstream frequency.                                             |
| <b>option</b>            | Specifies vendor-specific information fields and other config-file options. |
| <b>privacy</b>           | Specifies privacy options for baseline privacy images.                      |
| <b>snmp manager</b>      | Specifies SNMP options.                                                     |
| <b>timestamp</b>         | Enables time-stamp generation.                                              |

# service-type-id

To add a service type ID that is compared against the cable modem provisioned service type ID, to determine an appropriate restricted load balancing group (RLBG), use the **service-type-id** command in the config-lb-group configuration mode. To remove the service type ID, use the **no** form of this command.

**service-type-id** *string*

**no service-type-id** *string*

|                           |               |                                                                             |
|---------------------------|---------------|-----------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>string</i> | Identifier of the service type that gets added to the load balancing group. |
|---------------------------|---------------|-----------------------------------------------------------------------------|

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                                                    |
|----------------------|----------------------------------------------------|
| <b>Command Modes</b> | DOCSIS load balancing group mode (config-lb-group) |
|----------------------|----------------------------------------------------|

| <b>Command History</b> | Release     | Modification                 |
|------------------------|-------------|------------------------------|
|                        | 12.2(33)SCC | This command was introduced. |

|                         |                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | You can use the <b>service-type-id</b> command to add a service type ID only to a RLBG. |
|-------------------------|-----------------------------------------------------------------------------------------|

|                 |                                                                                                                 |
|-----------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to add a service type ID on the CMTS, using the <b>service-type-id</b> command. |
|-----------------|-----------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# restricted
Router(config-lb-group)# service-type-id commercial
Router(config-lb-group)# no service-type-id commercial
Router(config-lb-group)#
```

| <b>Related Commands</b> | Command                                     | Description                                                                                                             |
|-------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                         | <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
|                         | <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |

## service-type-id (cmts-tag)

To configure the specified service type ID for the CMTS tag, use the **service-type-id** command in the cmts-tag configuration mode. To remove the service type ID, use the **no** form of this command.

**[exclude] service-type-id** *service-type-id*

**no service-type-id** *service-type-id*

|                           |                        |                                                                              |
|---------------------------|------------------------|------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>exclude</b>         | (Optional) Configures the CMTS tag to exclude the specified service type ID. |
|                           | <i>service-type-id</i> | Sets a matching rule with the specified service type ID.                     |

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                          |
|----------------------|--------------------------|
| <b>Command Modes</b> | CMTS tag mode (cmts-tag) |
|----------------------|--------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCC    | This command was introduced. |

**Examples** The following example shows how to configure the specified service type ID for the CMTS tag using the **service-type-id** command:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable tag 1
Router(cmts-tag)# service-type-id commercial
```

| <b>Related Commands</b> | <b>Command</b>                              | <b>Description</b>                                                                                                       |
|-------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|                         | <b>cable load-balance docsis-group</b>      | To configure a DOCSIS load balancing group on the CMTS.                                                                  |
|                         | <b>show cable load-balance docsis-group</b> | To display real-time configuration, statistical and operational information for load balancing operations on the router. |
|                         | <b>cable tag</b>                            | To configure a tag for a DOCSIS load balancing group on the CMTS.                                                        |

# session-range

To identify the multicast QoS group session range, use the **session-range** command in multicast QoS configuration mode. To disable the QoS group session range, use the **no** form of this command.

**session-range** *ip-address ip-mask*

**no session-range** *ip-address ip-mask*

| Syntax Description | <i>ip-address</i> | Specifies the IP address of the multicast QoS group. |
|--------------------|-------------------|------------------------------------------------------|
|                    | <i>ip-mask</i>    | Specifies the IP mask of the multicast QoS group.    |

| Command Default | A session range IP address and IP mask are not defined for a specific multicast QoS group. |
|-----------------|--------------------------------------------------------------------------------------------|
|-----------------|--------------------------------------------------------------------------------------------|

| Command Modes | Multicast QoS configuration (config-mqos) |
|---------------|-------------------------------------------|
|---------------|-------------------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCA | This command was introduced. |

| Usage Guidelines | Use the <b>session-range</b> command to configure the session range to specify the number of multicast sessions to be admitted on a particular service flow. CMTS does not admit new sessions (no forwarding) if the current number of sessions has reached the defined limit, and waits until a session ends to free up a slot for new sessions. You can configure multiple session ranges. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Examples | The following example defines a session range IP address and IP mask using the <b>session-range</b> command: |
|----------|--------------------------------------------------------------------------------------------------------------|
|----------|--------------------------------------------------------------------------------------------------------------|

```
Router(config)# cable multicast qos group 20 priority 55 global
Router(config-mqos)# session-range 224.10.10.01 255.255.255.254
```

| Related Commands | Command                                         | Description                                                                 |
|------------------|-------------------------------------------------|-----------------------------------------------------------------------------|
|                  | <b>cable multicast qos group</b>                | Specifies and configures a cable multicast QoS group.                       |
|                  | <b>show interface bundle multicast-sessions</b> | Displays multicast session information for a specific virtual cable bundle. |
|                  | <b>show interface cable multicast-sessions</b>  | Displays multicast session information for a specific cable interface.      |

# set clock

To set the system clock on the Cisco CMTS, use the **set clock** command in global configuration mode.

**set clock** *time-date*

| Syntax Description | <i>time-date</i> | Time and date for which to set the clock on the Cisco CMTS. |
|--------------------|------------------|-------------------------------------------------------------|
|--------------------|------------------|-------------------------------------------------------------|

| Command Default | Time-of-Day, DHCP, and TFTP server configuration not defined on the Cisco CMTS by default. |
|-----------------|--------------------------------------------------------------------------------------------|
|-----------------|--------------------------------------------------------------------------------------------|

| Command Modes | Global configuration |
|---------------|----------------------|
|---------------|----------------------|

| Command History | Release    | Modification                                                                          |
|-----------------|------------|---------------------------------------------------------------------------------------|
|                 | 12.0(4)XI  | This feature was introduced for the Cisco uBR7200 series routers.                     |
|                 | 12.1(5)EC  | This feature was supported on the Cisco uBR7100 series routers.                       |
|                 | 12.2(4)BC1 | This feature was supported on the Release 12.2 BC train for all Cisco CMTS platforms. |

| Usage Guidelines | To supply an accurate clock, the system clock on the Cisco CMTS should be configured for the correct time, either by using the <b>set clock</b> command or by configuring the Cisco CMTS to act as a Network Time Protocol (NTP) or Simple Network Time Protocol (SNTP) client. |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

For proper operation of the DOCSIS network, especially a DOCSIS 1.1 network using BPI+ encryption and authentication, the system clock on the Cisco CMTS must be set accurately. You can achieve this by manually using the **set clock** command, or by configuring the CMTS to use either the Network Time Protocol (NTP) or the Simple Network Time Protocol (SNTP).

For additional information about the set clock command, refer to the following documents on Cisco.com:

- *Time-of-Day Server for the Cisco CMTS*
- *DHCP, ToD, and TFTP Services for the Cisco Cable Modem Termination System*

| Related Commands | Command                         | Description                                                                                                                                                                                                        |
|------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dhcp-giaddr policy</b> | Sets the DHCP <i>giaddr</i> field of DHCP request packets to the primary address for cable modems and the secondary address for CPE devices, allowing the use of separate address pools for the different clients. |
|                  | <b>cable dhcp-parse option</b>  | Enables the parsing of certain DHCP options.                                                                                                                                                                       |
|                  | <b>cable helper-address</b>     | Enables load-balancing of DHCP requests from cable modems and CPE devices by specifying different DHCP servers according to the cable interface or subinterface.                                                   |
|                  | <b>ip dhcp ping packet 0</b>    | Instructs the DHCP server to assign an IP address from its pool without first sending an ICMP ping to test whether a client is already currently using that IP address.                                            |

| Command                                 | Description                                                                                                                                                                                                       |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ip dhcp relay information option</b> | Configures the DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.                                                                                                        |
| <b>ip dhcp smart-relay</b>              | Enables the DHCP relay agent on the CMTS to automatically switch a cable modem or CPE device to a secondary DHCP server or address pool if the primary DHCP server does not respond to three successive requests. |

■ set clock





# Cable Commands: show a through show cable l

Revised: August 12, 2013, OL-15510-17

## New Commands

| Command                              | Cisco IOS Software Release |
|--------------------------------------|----------------------------|
| show cable clock dti counters        | 12.3(23)BC                 |
| show cable clock dti status,         | 12.3(23)BC                 |
| show cable ib-ipc                    | 12.3(23)BC                 |
| show cable flap-list wb-rf           | 12.2(33)SCB                |
| show cable fiber-node                | 12.2(33)SCC                |
| show cable ipc-stats                 | 12.2(33)SCC                |
| show cable load-balance docsis-group | 12.2(33)SCC                |
| show cable l2-vpn xconnect           | 12.2(33)SCC                |
| show cable dsg tg                    | 12.2(33)SCD5               |
| show cable licenses all              | 12.2(33)SCE                |
| show cable acfe controller           | 12.2(33)SCF                |
| show cable acfe interface            | 12.2(33)SCF                |
| show cable acfe summary              | 12.2(33)SCF                |
| show cable active-reman              | 12.2(33)SCF                |
| show cable dynamic-qos trace         | 12.2(33)SCF                |
| show cable bgsync                    | 12.2(33)SCG                |
| show cable cgd-associations          | 12.2(33)SCG                |
| show cable dsg cfr                   | 12.2(33)SCG                |
| show cable dsg host                  | 12.2(33)SCG                |
| show cable dsg static-group bundle   | 12.2(33)SCG                |

**Modified Commands**

| Command                              | Cisco IOS Software Release |
|--------------------------------------|----------------------------|
| show cable admission-control         | 12.3(23)BC                 |
| show cable clock                     | 12.3(23)BC                 |
| show cable filter                    | 12.2(33)SCA                |
| show cable l2-vpn dot1q-vc-map       | 12.2(33)SCA                |
| show cable logging                   | 12.3(23)BC5                |
| show cable logging                   | 12.2(33)SCB                |
| show cable hop                       | 12.3(23)BC7                |
| show cable admission-control         | 12.2(33)SCC                |
| show cable flap-list                 | 12.2(33)SCC                |
| show cable load-balance              | 12.2(33)SCC                |
| show cable hop                       | 12.2(33)SCC                |
| show cable admission-control         | 12.2(33)SCF                |
| show cable ipc-stats                 | 12.2(33)SCF                |
| show cable l2-vpn xconnect           | 12.2(33)SCF                |
| show cable load-balance              | 12.2(33)SCF                |
| show cable load-balance docsis-group | 12.2(33)SCF                |
| show cable load-balance              | 12.2(33)SCE4               |
| show cable leasequery-filter         | 12.2(33)SCF1               |
| show cable dsg tg                    | 12.2(33)SCG                |
| show cable load-balance              | 12.2(33)SCG                |
| show cable logging                   | 12.2(33)SCG                |
| show cable load-balance              | 12.2(33)SCH1               |

**Replaced Commands**

| Command        | Replacement Command   | Effective Cisco IOS Release |
|----------------|-----------------------|-----------------------------|
| show cable dsg | show cable dsg tunnel | 12.3(13a)BC                 |

# show application-buckets

To displays rules for any or all buckets supporting Service Flow Admission Control on the Cisco CMTS, use the **show application-buckets** command in privileged EXEC mode. The configured rules for any given bucket are displayed in order of precedence in the Rule field.

**show application-buckets [ bucket-no *n* ]**

## Syntax Description

|                           |                                                                                                                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>bucket-no <i>n</i></b> | You may specify a specific bucket number on the Cisco CMTS to display parameters for that bucket and no others. Valid range is 1 to 8, or all buckets if no specific bucket is designated. |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

No default behavior or values for this command. However, Cisco IOS Release 12.3(21)BC supports default operation and non-default configuration for feature on the Cisco CMTS.

## Command Modes

Privileged EXEC

## Command History

| Release    | Modification                                                                               |
|------------|--------------------------------------------------------------------------------------------|
| 12.3(21)BC | This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router. |

## Usage Guidelines

For additional information for Service Flow Admission Control, commencing in Cisco IOS Release 12.3(21)BC, refer to the following document on Cisco.com:

- *Service Flow Admission Control for the Cisco Cable Modem Termination System*

## Examples

The following example illustrates sample output of the show application-buckets command.

```
Router# show cable application-type

For bucket 1, Name PktCable
 Packetcable normal priority gates
 Packetcable high priority gates
For bucket 2, Name PCMM-Vid
 PCMM gate app-id = 30
For bucket 3, Name Gaming
 PCMM gate app-id = 40
For bucket 4, Name
For bucket 5, Name
For bucket 6, Name
For bucket 7, Name
For bucket 8, Name HSD
 Best-effort (CIR) flows
```

| Related Commands | Command                                                   | Description                                                                                                                                                                                                    |
|------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable admission-control ds-bandwidth</b>               | Sets minor, major and exclusive thresholds for downstream voice or data bandwidth for each or all interfaces on the Cisco CMTS                                                                                 |
|                  | <b>cable admission-control preempt priority-voice</b>     | Changes the default PacketCable Emergency 911 call preemption functions on the Cisco CMTS, supporting throughput and bandwidth requirements for Emergency 911 calls above all other buckets on the Cisco CMTS. |
|                  | <b>cable admission-control us-bandwidth</b>               | Configures global or interface-level upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS.                                                                                 |
|                  | <b>cable application-type include</b>                     | Associates an application type with a specific and prioritized bucket on the Cisco CMTS.                                                                                                                       |
|                  | <b>cable application-type name</b>                        | Assigns an alpha-numeric name for the specified bucket.                                                                                                                                                        |
|                  | <b>debug cable admission-control flow-categorization</b>  | Displays service flow categorization results, enabled when a service flow is classified.                                                                                                                       |
|                  | <b>show application-buckets</b>                           | Displays rules for any or all buckets supporting Service Flow Admission Control on the Cisco CMTS.                                                                                                             |
|                  | <b>show interface cable admission-control reservation</b> | Displays service flows, categorizations, and bandwidth consumption on the Cisco CMTS, for the specified interface, and the specified service flow direction.                                                   |

# show bridge cable-modem

To display bridging information for the router's cable interface, use the **show bridge cable-modem** command in privileged EXEC mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show bridge cable-modem** *number*

|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> Identifies the cable interface (always <b>0</b> ). |
|---------------------------|------------------------------------------------------------------|

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                   |
|------------------------|----------------|-----------------------------------------------------------------------|
|                        | 11.3(4)NA      | This command was introduced for the Cisco uBR904 cable access router. |
|                        | 12.0(4)XI1     | Support was added for the Cisco uBR924 cable access router.           |
|                        | 12.1(3)XL      | Support was added for the Cisco uBR905 cable access router.           |
|                        | 12.1(5)XU1     | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                        | 12.2(2)XA      | Support was added for the Cisco uBR925 cable access router.           |

**Examples** The following example shows sample output for this **show bridge cable-modem** command:

```
Router# show bridge cable-modem 0

Total of 300 station blocks, 298 free
Codes: P - permanent, S - self

Bridge Group 59:
```

[Table 0-1](#) describes the significant fields shown in the display.

**Table 0-43 show bridge cable-modem Field Descriptions**

| <b>Field</b>                | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total of 300 station blocks | Total number of forwarding database elements in the system. The memory to hold bridge entries is allocated in blocks of memory sufficient to hold 300 individual entries. When the number of free entries falls below 25, another block of memory sufficient to hold another 300 entries is allocated. Thus, the total number of forwarding elements in the system is expanded dynamically, as needed, limited by the amount of free memory in the router. |
| Bridge Group                | The number of the bridge group to which this interface is assigned.                                                                                                                                                                                                                                                                                                                                                                                        |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                            | Description                                                      |
|------------------------------------|------------------------------------------------------------------|
| <b>show dhcp</b>                   | Displays the current DHCP settings on point-to-point interfaces. |
| <b>show interfaces cable-modem</b> | Displays information about the cable interface.                  |

# show cable acfe controller

To display fairness across DOCSIS interfaces controller statistics, use the **show cable acfe controller** command in privileged EXEC mode.

**show cable acfe controller modular-cable** *slot/subslot/unit* [**cluster** *cluster-index*]

|                    |                      |                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>modular-cable</b> | Displays information for all controllers on the specified modular cable interface on a Cisco uBR10012 router, where: <ul style="list-style-type: none"><li><i>slot</i>—Controller slot number. The valid values range from 0 to 8.</li><li><i>subslot</i>—Controller subslot number. The valid values range from 0 to 3.</li><li><i>unit</i>—Controller unit number. The valid value is 0.</li></ul> |
|                    | <b>cluster</b>       | Displays information at the cluster level. <ul style="list-style-type: none"><li><i>cluster-index</i>—Cluster index. The valid values range from 0 to 253.</li></ul>                                                                                                                                                                                                                                 |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCF    | This command was introduced. |

|                  |                                                                                                                                                  |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | Use the <b>show cable acfe controller</b> command to show fairness across DOCSIS interfaces status and statistics for each controller interface. |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|

**Examples** The following example shows a sample output of the **show cable acfe controller** command:

```
Router# show cable acfe controller modular-Cable 1/0/0
```

```
EIR Rebalance invoked: 76476
Adaptive CIR granted: 0
Adaptive CIR rejected: 0
Total clusters: 2
RF FlexBW
0 28687
1 28687
RF FlexBW
2 28687
3 28687
```

The following example shows a sample output of the **show cable acfe controller** command with the **cluster** keyword:

```
Router# show cable acfe controller modular-Cable 1/0/0 cluster 1
```

```
EIR Rebalance invoked: 1810
Adaptive CIR granted: 0
Adaptive CIR rejected: 0
```

**show cable acfe controller**

```

Total clusters: 2
RF FlexBW
2 28687
3 28687

```

Table 44 describes the significant fields shown in the display.

**Table 44** *show cable acfe controller Field Descriptions*

| Field                 | Description                      |
|-----------------------|----------------------------------|
| EIR Rebalance invoked | Number of EIR rebalance invoked. |
| Adaptive CIR granted  | Number of CIRs granted.          |
| Adaptive CIR rejected | Number of CIRs rejected.         |
| Total Clusters        | Cluster numbers.                 |
| RF                    | RF channel number.               |
| FlexBW                | Flexible bandwidth.              |

**Related Commands**

| Command                          | Description                                                                    |
|----------------------------------|--------------------------------------------------------------------------------|
| <b>show cable acfe interface</b> | Displays fairness across DOCSIS interfaces statistics of a specific interface. |
| <b>show cable acfe summary</b>   | Displays fairness across DOCSIS interfaces status and statistics.              |



# show cable acfe interface

To display the fairness across DOCSIS interfaces statistics of a specific interface, use the **show cable acfe interface** command in privileged EXEC mode.

**show cable acfe interface {modular-cable | wideband-cable | integrated-cable}**  
*slot/subslot/port:interface-num* [**verbose**]

| Syntax Description | <b>interface</b> | Specifies the cable interface. <ul style="list-style-type: none"><li>• <b>modular-cable</b>—Specifies the modular cable interface.</li><li>• <b>wideband-cable</b>—Specifies the wideband cable interface.</li><li>• <b>integrated-cable</b>—Specifies the integrated cable interface.</li><li>• <i>slot</i>—Slot number of the cable interface. The valid range is from 5 to 8.</li><li>• <i>subslot</i>—Subslot number of the cable interface. The valid values are 0 or 1.</li><li>• <i>port</i>—Port number. The valid values are 0 or 1.</li><li>• <i>interface-num</i>—Interface number. The valid range is from 0 to 23 for modular interface, 0 to 31 for the wideband interface, and 0 to 3 for the integrated interface.</li></ul> |
|--------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <b>verbose</b>   | (Optional) Enables verbose mode for the output, giving additional details about the modular, wideband or integrated interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

**Usage Guidelines**

Use the **show cable acfe interface** command to display the fairness across DOCSIS interfaces statistics on a specific interface. The command output also displays the route processor Service Flow Admission Control (SFAC) shadow with thresholds and reservations.

The **integrated-cable** option works only on the Cisco UBR-MC20X20V cable interface line cards.

**Examples**

The following examples show sample outputs of the **show cable acfe interface** command:

```
Router# show cable acfe interface modular-Cable 1/0/0:1
```

```
Adaptive CIR granted: 0
Adaptive CIR rejected: 0
EIR Demand (raw/scale): 0/1
EIR Per-Flow BW (kbps): 18991
Guar Bonus BW (kbps): 18991
Non-guar Bonus BW (kbps): 9696
Reserved Bonus BW (kbps): 0
```

## ■ show cable acfe interface

```
Router# show cable acfe interface wideband-Cable 1/0/0:1
```

```
Adaptive CIR granted: 0
Adaptive CIR rejected: 0
EIR Demand (raw/scale): 0/1
EIR Per-Flow BW (kbps): 18991
Guar Bonus BW (kbps): 19391
Non-guar Bonus BW (kbps): 37983
Reserved Bonus BW (kbps): 400
```

```
Router# show cable acfe interface integrated-Cable 6/1/0:0
```

```
Adaptive CIR granted: 0
Adaptive CIR rejected: 0
EIR Demand (raw/scale): 0/1
EIR Per-Flow BW (kbps): 20028
Guar Bonus BW (kbps): 20028
Non-guar Bonus BW (kbps): 10009
Reserved Bonus BW (kbps): 0
```

Table 44 describes the significant fields shown in the display.

**Table 45** *show cable acfe interface Field Descriptions*

| Field                    | Description                                                              |
|--------------------------|--------------------------------------------------------------------------|
| Adaptive CIR granted     | Number of adaptive CIRs granted.                                         |
| Adaptive CIR rejected    | Number of adaptive CIRs rejected.                                        |
| EIR Demand (raw/scale)   | Total EIR demand.                                                        |
| EIR Per-Flow BW (kbps)   | Expected saturated throughput of a priority 0 BE flow on this interface. |
| Guar Bonus BW (kbps)     | Guaranteed bonus bandwidth, in kilobytes per second.                     |
| Non-guar Bonus BW (kbps) | Non-guaranteed bonus bandwidth, in kilobytes per second.                 |
| Reserved Bonus BW (kbps) | Reserved bonus bandwidth, in kilobytes per second.                       |

#### Related Commands

| Command                           | Description                                                       |
|-----------------------------------|-------------------------------------------------------------------|
| <b>show cable acfe controller</b> | Displays fairness across DOCSIS interfaces controller statistics. |
| <b>show cable acfe summary</b>    | Displays fairness across DOCSIS interfaces status and statistics. |

# show cable acfe summary

To display the fairness across DOCSIS interfaces status and statistics, use the **show cable acfe summary** command in privileged EXEC mode.

## show cable acfe summary

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

**Usage Guidelines** The **show cable acfe summary** command displays the global fairness across DOCSIS interfaces status and statistics.

**Examples** The following example shows a sample output of the **show cable acfe summary** command:

```
Router# show cable acfe summary

ACFE state: Enabled
EIR Rebalance period (secs): 5
EIR Rebalance invocations: 32416
CIR Acquire invocations: 1
CIR Acquire rate/limit: 100/100
CIR Acquire throttled: 0
Maximal EIR ratio: 16
```

Table 44 describes the significant fields shown in the display.

**Table 46** *show cable acfe summary Field Descriptions*

| Field                       | Description                                                                 |
|-----------------------------|-----------------------------------------------------------------------------|
| ACFE state                  | Fairness across DOCSIS interfaces state, enabled or disabled.               |
| EIR Rebalance period (secs) | EIR rebalance period, in seconds.                                           |
| EIR Rebalance invocations   | Number of EIR rebalance invocations.                                        |
| CIR Acquire invocations     | Number of CIR acquire invocations.                                          |
| CIR Acquire rate/limit      | CIR acquire rate and limit.                                                 |
| CIR Acquire throttled       | Number of CIR acquisitions that failed because they reached the rate limit. |
| Maximal EIR ratio           | Maximum EIR ratio.                                                          |

 show cable acfe summary

| Related Commands | Command                  | Description                                                           |
|------------------|--------------------------|-----------------------------------------------------------------------|
|                  | <b>cable acfe enable</b> | Enables Fairness Across DOCSIS Interfaces feature on the CMTS router. |

# show cable active-reman

To display the line card high availability information, use the **show cable active-reman** command in privileged EXEC mode.

**show cable active-reman** {all | slot/subslot}

|                    |                |                                                                      |
|--------------------|----------------|----------------------------------------------------------------------|
| Syntax Description | <b>all</b>     | Displays high availability information for all line card interfaces. |
|                    | <i>slot</i>    | Cable interface line card slot. The valid range is from 5 to 8.      |
|                    | <i>subslot</i> | Cable interface line card subslot. The valid range is 0 and 1.       |

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                                                               |
|-----------------|----------------|---------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                           |
|                 | 12.2(33)SCF    | This command was introduced in Cisco IOS Release 12.2(33)SCF. |

**Examples** The following is a sample output of the **show cable active-reman** command that shows high availability information for all cable interfaces on the Cisco uBR10012 router:

```
Router# show cable active-reman all
```

```

Active Reman info on LC 5/0:
```

```
[slot_index 0]: work_slot:1/0, active_slot:1/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 1]: work_slot:3/0, active_slot:3/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 2]: work_slot:5/0, active_slot:5/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 3]: work_slot:5/1, active_slot:5/1, is_protect:TRUE , is_standby
:TRUE
[slot_index 4]: work_slot:6/0, active_slot:6/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 5]: work_slot:6/1, active_slot:6/1, is_protect:FALSE, is_standby
:FALSE
[slot_index 6]: work_slot:7/0, active_slot:7/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 7]: work_slot:7/1, active_slot:7/1, is_protect:FALSE, is_standby
:FALSE
[slot_index 8]: work_slot:8/0, active_slot:8/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 9]: work_slot:8/1, active_slot:8/1, is_protect:FALSE, is_standby
:FALSE

```

## ■ show cable active-reman

Active Reman info on LC 5/1:

```
[slot_index 0]: work_slot:1/0, active_slot:1/0, is_protect:FALSE, is_standby:FALSE
[slot_index 1]: work_slot:3/0, active_slot:3/0, is_protect:FALSE, is_standby:FALSE
[slot_index 2]: work_slot:5/0, active_slot:5/0, is_protect:FALSE, is_standby:FALSE
[slot_index 3]: work_slot:5/1, active_slot:5/1, is_protect:TRUE , is_standby:TRUE
[slot_index 4]: work_slot:6/0, active_slot:6/0, is_protect:FALSE, is_standby:FALSE
[slot_index 5]: work_slot:6/1, active_slot:6/1, is_protect:FALSE, is_standby:FALSE
[slot_index 6]: work_slot:7/0, active_slot:7/0, is_protect:FALSE, is_standby:FALSE
[slot_index 7]: work_slot:7/1, active_slot:7/1, is_protect:FALSE, is_standby:FALSE
[slot_index 8]: work_slot:8/0, active_slot:8/0, is_protect:FALSE, is_standby:FALSE
[slot_index 9]: work_slot:8/1, active_slot:8/1, is_protect:FALSE, is_standby:FALSE
```

-----

Active Reman info on LC 6/0:

```
[slot_index 0]: work_slot:1/0, active_slot:1/0, is_protect:FALSE, is_standby:FALSE
[slot_index 1]: work_slot:3/0, active_slot:3/0, is_protect:FALSE, is_standby:FALSE
[slot_index 2]: work_slot:5/0, active_slot:5/0, is_protect:FALSE, is_standby:FALSE
[slot_index 3]: work_slot:5/1, active_slot:5/1, is_protect:TRUE , is_standby:TRUE
[slot_index 4]: work_slot:6/0, active_slot:6/0, is_protect:FALSE, is_standby:FALSE
[slot_index 5]: work_slot:6/1, active_slot:6/1, is_protect:FALSE, is_standby:FALSE
[slot_index 6]: work_slot:7/0, active_slot:7/0, is_protect:FALSE, is_standby:FALSE
[slot_index 7]: work_slot:7/1, active_slot:7/1, is_protect:FALSE, is_standby:FALSE
[slot_index 8]: work_slot:8/0, active_slot:8/0, is_protect:FALSE, is_standby:FALSE
[slot_index 9]: work_slot:8/1, active_slot:8/1, is_protect:FALSE, is_standby:FALSE
```

-----

Active Reman info on LC 7/0:

```
[slot_index 0]: work_slot:1/0, active_slot:1/0, is_protect:FALSE, is_standby:FALSE
[slot_index 1]: work_slot:3/0, active_slot:3/0, is_protect:FALSE, is_standby:FALSE
[slot_index 2]: work_slot:5/0, active_slot:5/0, is_protect:FALSE, is_standby:FALSE
[slot_index 3]: work_slot:5/1, active_slot:5/1, is_protect:TRUE , is_standby:TRUE
[slot_index 4]: work_slot:6/0, active_slot:6/0, is_protect:FALSE, is_standby:FALSE
[slot_index 5]: work_slot:6/1, active_slot:6/1, is_protect:FALSE, is_standby:FALSE
[slot_index 6]: work_slot:7/0, active_slot:7/0, is_protect:FALSE, is_standby:FALSE
[slot_index 7]: work_slot:7/1, active_slot:7/1, is_protect:FALSE, is_standby:FALSE
```

```

[slot_index 8]: work_slot:8/0, active_slot:8/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 9]: work_slot:8/1, active_slot:8/1, is_protect:FALSE, is_standby
:FALSE

Active Reman info on LC 8/0:
[slot_index 0]: work_slot:1/0, active_slot:1/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 1]: work_slot:3/0, active_slot:3/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 2]: work_slot:5/0, active_slot:5/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 3]: work_slot:5/1, active_slot:5/1, is_protect:TRUE , is_standby
:TRUE
[slot_index 4]: work_slot:6/0, active_slot:6/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 5]: work_slot:6/1, active_slot:6/1, is_protect:FALSE, is_standby
:FALSE
[slot_index 6]: work_slot:7/0, active_slot:7/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 7]: work_slot:7/1, active_slot:7/1, is_protect:FALSE, is_standby
:FALSE
[slot_index 8]: work_slot:8/0, active_slot:8/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 9]: work_slot:8/1, active_slot:8/1, is_protect:FALSE, is_standby

```

The following is a sample output of the **show cable active-reman** command that shows high availability information for slot 5 and subslot 0 on the Cisco uBR10012 router:

```
Router# show cable active-reman 5/0
```

```

Active Reman info on LC 5/0:

[slot_index 0]: work_slot:1/0, active_slot:1/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 1]: work_slot:3/0, active_slot:3/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 2]: work_slot:5/0, active_slot:5/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 3]: work_slot:5/1, active_slot:5/1, is_protect:TRUE , is_standby
:TRUE
[slot_index 4]: work_slot:6/0, active_slot:6/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 5]: work_slot:6/1, active_slot:6/1, is_protect:FALSE, is_standby
:FALSE
[slot_index 6]: work_slot:7/0, active_slot:7/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 7]: work_slot:7/1, active_slot:7/1, is_protect:FALSE, is_standby
:FALSE
[slot_index 8]: work_slot:8/0, active_slot:8/0, is_protect:FALSE, is_standby
:FALSE
[slot_index 9]: work_slot:8/1, active_slot:8/1, is_protect:FALSE, is_standby
:FALSE

```

# show cable admission-control

To display the current admission control (AC) configuration and status on a Cisco CMTS router, or on a specified interface, use the **show cable admission-control** command in privileged EXEC mode.

**show cable admission-control** [**global**] **interface** *slot/port* | *slot/subslot/port*] [**all** | **verbose**]

Cisco IOS Release 12.2(33)SCE and later

**show cable admission-control** {**global** | **interface** {**cable** *slot/subslot/cable-interface-index* | **integrated-cable** | **modular-cable** | **wideband-cable**} *slot/subslot/port:interface-num* [**verbose**] | **all**}}

| Syntax Description                                           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>global</b>                                                |  | Displays the following information: <ul style="list-style-type: none"> <li>Parameters configured for AC.</li> <li>Number of requests that crossed minor, major, and critical levels for each resource.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>interface</b> <i>slot/port</i>   <i>slot/subslot/port</i> |  | Displays admission control information for the specified interface. This includes the following: <ul style="list-style-type: none"> <li><i>slot</i>—Slot on the interface. The valid range is from 5 to 8 for the Cisco uBR10012 router and from 3 to 6 for the Cisco uBR7200 series routers.</li> <li><i>subslot</i>—Subslot on the interface. The valid values are 0 or 1.</li> <li><i>port</i>—Port on the interface. The valid range is from 0 to 4 for the Cisco uBR10012 router and 0 or 1 for the Cisco uBR7200 series routers.</li> <li><i>cable-interface-index</i> <ul style="list-style-type: none"> <li>Cisco uBR7200 series routers—The valid values are 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards, and 0 to 14 for the Cisco uBR-MC3GX60V line card.</li> </ul> </li> <li><i>interface-num</i>—Interface number. The valid range is from 0 to 23 for the modular interface, 0 to 31 for the wideband interface, and 0 to 3 for the integrated interface.</li> </ul> |
| <b>all</b>                                                   |  | (Optional) Displays information for all interfaces configured for AC on the Cisco CMTS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>verbose</b>                                               |  | (Optional) Displays detailed information for the wideband interface configured for AC on the Cisco CMTS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                              |
|-----------------|-------------|-------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced on the Cisco uBR10012 router and the Cisco uBR7246VXR router. |
|                 | 12.3(23)BC  | This command was modified; new fields were added to the output.                           |



| Release     | Modification                                                                                                                                                                                                    |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                              |
| 12.2(33)SCC | This command was modified to display DS threshold values and reservations per bucket on a modular cable, interface cable, or DS channel bonding.                                                                |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |
| 12.2(33)SCF | This command was modified to display guaranteed and non-guaranteed bonus bandwidth from the ACFE functionality.                                                                                                 |

### Usage Guidelines

The **show cable admission-control** command offers flexible syntax that enables display of the AC as specifically configured on the Cisco CMTS. See the examples for additional information.

The **verbose** keyword is not applicable to integrated-cable and modular-cable interfaces.

### Examples

The following example displays upstream and downstream AC information for the specified cable interface:

```
Router# show cable admission-control interface cable 7/0/0
```

```
Interface Cable7/0/0
```

```
Resource - Upstream Bandwidth
```

```

```

Thresholds applicable to upstream ports with no interface level configurations in place

| Bucket No | Minor Level | Major Level | Exclusive Level | Non-Excls Level |
|-----------|-------------|-------------|-----------------|-----------------|
| 1         | 0           | 0           | 0               | 0               |
| 2         | 0           | 0           | 0               | 0               |
| 3         | 0           | 0           | 0               | 0               |
| 4         | 0           | 0           | 0               | 0               |
| 5         | 0           | 0           | 0               | 0               |
| 6         | 0           | 0           | 0               | 0               |
| 7         | 0           | 0           | 0               | 0               |
| 8         | 0           | 0           | 0               | 0               |

```
Downstream Bit Rate (bits per second) = 24273316
```

```
Resource - Downstream Bandwidth
```

```

```

| Bkt No | Name | Minor Level | # of Times | Major Level | # of Times | Excls Level | # of Times | Non-Ex Level | Curr. Resv | Curr. Ovrsb | Conf Level | # of Rej |
|--------|------|-------------|------------|-------------|------------|-------------|------------|--------------|------------|-------------|------------|----------|
| 1      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0         | G          | 0        |
| 2      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0         | G          | 0        |
| 3      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0         | G          | 0        |
| 4      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0         | G          | 0        |
| 5      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0         | G          | 0        |
| 6      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0         | G          | 0        |
| 7      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0         | G          | 0        |
| 8      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 12.3       | 0.0         | G          | 0        |

Note: \* indicates that the thresholds are implicit

## show cable admission-control

```

Resource - Modular Downstream Bandwidth

Interface Total(Kbps) Reservable(Kbps) Allocated(Kbps)
Mo1/0/0:0 19405 12424 3100

```

### Example of the Updated show cable admission-control Command Output for a Wideband Cable Interface in Cisco IOS Release 12.2(33)SCF

The following example displays the upstream and downstream AC information for the wideband-cable interface:

```
Router# show cable admission-control interface wideband-Cable 1/0/0:1
```

```

Interface Wideband-Cable1/0/0:1
Configured AC Max Reservable Bandwidth = 600000 bps

```

```

Resource - Downstream Bandwidth

Bkt Name Minor # of Major # of Excls # of Non-Ex Curr. Curr. Conf # of
No Level Times Level Times Level Times Level Resv Ovrslb Level Rej
1 0 0 0 0 0 0 0 0 0.0 0.0 G 0
2 0 0 0 0 0 0 0 0 0.0 0.0 G 0
3 0 0 0 0 0 0 0 0 0.0 0.0 G 0
4 0 0 0 0 0 0 0 0 0.0 0.0 G 0
5 0 0 0 0 0 0 0 0 0.0 0.0 G 0
6 0 0 0 0 0 0 0 0 0.0 0.0 G 0
7 0 0 0 0 0 0 0 0 0.0 0.0 G 0
8 0 0 0 0 0 0 100* 1333.3 1233.3 G 0
Note: * indicates that the thresholds are implicit

```

### Example of the Updated show cable admission-control verbose Command Output for a Wideband Cable Interface in Cisco IOS Release 12.2(33)SCF

The following example displays the detailed upstream and downstream AC information for the wideband-cable interface with the **verbose** keyword:

```
Router# show cable admission-control interface wideband-Cable 1/0/0:1 verbose
```

```

Interface Wideband-Cable1/0/0:0
Configured AC Max Reservable Bandwidth = 72000000 bps

```

```

Resource - Downstream Bandwidth

Bkt Name Minor # of Major # of Excls # of Non-Ex Curr. Curr. Conf # of
No Level Times Level Times Level Times Level Resv Ovrslb Level Rej
1 DEF_MULTI 10 0 20 0 25 0 0 0.0 0.0 I 0
2 PKTCBL_N 2 0 3 0 5 0 0 0.0 0.0 I 0
3 PCMM_1 1 0 2 0 3 0 0 0.0 0.0 I 0
4 0 0 0 0 0 0 0 0.0 0.0 I 0
5 0 0 0 0 0 0 0 0.0 0.0 I 0
6 0 0 0 0 0 0 0 0.0 0.0 I 0
7 0 0 0 0 0 0 0 0.0 0.0 I 0
8 0 0 0 0 0 0 67* 27.7 0.0 I 0
Note: * indicates that the thresholds are implicit
WB-NB CIR for Wideband-Cable1/0/0:0

```

```
CIR Values for Cable6/1/0
```

```

Bkt SFAC BW Rsvd CIR Reject #
1 4499750 0 0
2 1800000 0 0
3 540000 0 0
4 0 0 0

```

```

5 0 0 0
6 0 0 0
7 0 0 0
8 34120000 20000000 0
Available Guaranteed Bonus BW (bps): 2531250
Available Non-guaranteed Bonus BW (bps): 10125000

```

```

CIR Values for Cable6/1/1
Bkt SFAC BW Rsvd CIR Reject #
1 4499750 0 0
2 1800000 0 0
3 540000 0 0
4 0 0 0
5 0 0 0
6 0 0 0
7 0 0 0
8 14120000 0 0
Available Guaranteed Bonus BW (bps): 2531250
Available Non-guaranteed Bonus BW (bps): 10125000

```

```

WB Multicast CIR Utilization
Bkt SFAC BW Rsvd CIR Reject #
1 9000500 1000 0
2 0 0 0
3 1080000 0 0
4 0 0 0
5 0 0 0
6 0 0 0
7 0 0 0
8 0 0 0
Available Guaranteed Bonus BW (bps):
5062500 Available Non-guaranteed Bonus BW (bps): 10125000

```

### Example of the Updated show cable admission-control Command Output for a Modular Cable Interface in Cisco IOS Release 12.2(33)SCF

The following example displays upstream and downstream AC information for the specified modular cable interface:

```
Router# show cable admission-control interface modular-Cable 1/0/0:1
```

```
Interface Mol/0/0:1
```

```
Configured AC Max Reservable Bandwidth = 3000000 bps
```

```

Resource - Downstream Bandwidth

Bkt Name Minor # of Major # of Excls # of Non-Ex Curr. Curr. Conf # of
No Level Times Level Times Level Resv Ovrslb Level Rej
1 0 0 0 0 0 0 100* 0.0 0.0 G 0
2 0 0 0 0 0 0 100* 0.0 0.0 G 0
3 0 0 0 0 0 0 100* 0.0 0.0 G 0
4 0 0 0 0 0 0 100* 0.0 0.0 G 0
5 0 0 0 0 0 0 100* 0.0 0.0 G 0
6 0 0 0 0 0 0 100* 0.0 0.0 G 0
7 0 0 0 0 0 0 100* 0.0 0.0 G 0
8 0 0 0 0 0 0 100* 0.0 0.0 G 0

```

Note: \* indicates that the thresholds are implicit

Total Current Reservation = 0 bps

Guaranteed Bonus available/total = 13657000/13657000 bps

Non-guaranteed Bonus available/total = 13658000/13658000 bps

### Example of the Updated show cable admission-control Command Output for an Integrated Cable Interface in Cisco IOS Release 12.2(33)SCF

The following example displays upstream and downstream AC information for the specified integrated cable interface:

Router# **show cable admission-control interface integrated-Cable 6/1/0:0**

Interface In6/1/0:0

Configured AC Max Reservable Bandwidth = 300000 bps

Resource - Downstream Bandwidth

| Bkt No | Name | Minor Level | # of Times | Major Level | # of Times | Excls Level | # of Times | Non-Ex Level | Curr. Resv | Curr. Ovrslb | Conf Level | # of Rej |
|--------|------|-------------|------------|-------------|------------|-------------|------------|--------------|------------|--------------|------------|----------|
| 1      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0          | G          | 0        |
| 2      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0          | G          | 0        |
| 3      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0          | G          | 0        |
| 4      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0          | G          | 0        |
| 5      | ACFE | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0          | G          | 0        |
| 6      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0          | G          | 0        |
| 7      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0          | G          | 0        |
| 8      |      | 0           | 0          | 0           | 0          | 0           | 0          | 100*         | 0.0        | 0.0          | G          | 0        |

Note: \* indicates that the thresholds are implicit

Total Current Reservation = 0 bps

Guaranteed Bonus available/total = 20028000/20028000 bps

Non-guaranteed Bonus available/total = 10009000/10009000 bps

The following example displays upstream and downstream AC information for the specified cable interface:

Router# **show cable admission-control interface cable 6/1/0**

Interface Cable6/1/0

Resource - Upstream Bandwidth

Thresholds applicable to upstream ports with no interface level configurations in place

| Bucket No | Name     | Minor Level | Major Level | Exclusive Level | Non-Excls Level | Config Level |
|-----------|----------|-------------|-------------|-----------------|-----------------|--------------|
| 1         | DEF_MULT | 15          | 20          | 25              | 10              | I            |
| 2         | UGS      | 15          | 20          | 25              | 10              | I            |
| 3         | PCMM_1   | 0           | 0           | 0               | 0*              | I            |
| 4         |          | 0           | 0           | 0               | 0*              | I            |
| 5         |          | 0           | 0           | 0               | 0*              | I            |
| 6         |          | 0           | 0           | 0               | 0*              | I            |
| 7         |          | 0           | 0           | 0               | 0*              | I            |
| 8         |          | 10          | 15          | 20              | 15              | I            |

Downstream Bit Rate (bits per second) = 34307436

Resource - Downstream Bandwidth

| Bkt No | Name     | Minor Level | # of Times | Major Level | # of Times | Excls Level | # of Times | Non-Ex Level | Curr. Resv | Curr. Ovrslb | Conf Level | # of Rej |
|--------|----------|-------------|------------|-------------|------------|-------------|------------|--------------|------------|--------------|------------|----------|
| 1      | DEF_MULT | 1           | 0          | 3           | 0          | 10          | 0          | 0            | 0.0        | 0.0          | I          | 0        |
| 2      | UGS      | 10          | 0          | 15          | 0          | 20          | 0          | 5            | 0.2        | 0.0          | I          | 0        |
| 3      | PCMM_1   | 0           | 0          | 0           | 0          | 0           | 0          | 70 *         | 0.0        | 0.0          | I          | 0        |
| 4      |          | 0           | 0          | 0           | 0          | 0           | 0          | 70 *         | 0.0        | 0.0          | I          | 0        |
| 5      |          | 0           | 0          | 0           | 0          | 0           | 0          | 70 *         | 0.0        | 0.0          | I          | 0        |
| 6      |          | 0           | 0          | 0           | 0          | 0           | 0          | 70 *         | 0.0        | 0.0          | I          | 0        |
| 7      |          | 0           | 0          | 0           | 0          | 0           | 0          | 70 *         | 0.0        | 0.0          | I          | 0        |
| 8      |          | 0           | 0          | 0           | 0          | 0           | 0          | 70 *         | 58.7       | 0.0          | I          | 0        |

The following example displays upstream and downstream AC information with the **global** keyword:

```
Router# show cable admission-control global
```

```
CM registration event enabled
Dynamic service event enabled
Call preemption due to priority call enabled
```

```
Resource Minor #times Major #times Critical #times Current
cpu-5sec 50% 7 70% 0 99% 0 2
proc-mem 50% 0 80% 0 90% 0 11
io-mem 50% 1 60% 1 90% 0 75
total-mem 50% 0 80% 0 90% 0 36
```

```
Number of Packetcable voice calls = 80/100 (maximum)
```

```
Number of times voice count exceeded = 1
```

```
Resource - Upstream Bandwidth
```

```

```

Thresholds applicable to upstream ports with no interface or port level configurations in place

| Bucket No | Name      | Minor Level | Major Level | Exclusive Level | Non-Excls Level |
|-----------|-----------|-------------|-------------|-----------------|-----------------|
| 1         | DEF_MULTI | 5           | 8           | 20              | 10              |
| 2         | UGS       | 5           | 10          | 15              | 5               |
| 3         | PCMM_1    | 0           | 0           | 0               | 0               |
| 4         |           | 0           | 0           | 0               | 0               |
| 5         |           | 0           | 0           | 0               | 0               |
| 6         |           | 40          | 45          | 50              | 5               |
| 7         |           | 0           | 0           | 0               | 0               |
| 8         |           | 0           | 0           | 0               | 0               |

```
Resource - Downstream Bandwidth
```

```

```

Thresholds applicable to interfaces with no interface level configurations in place

| Bucket No | Name      | Minor Level | Major Level | Exclusive Level | Non-Excls Level |
|-----------|-----------|-------------|-------------|-----------------|-----------------|
| 1         | DEF_MULTI | 0           | 0           | 0               | 0               |
| 2         | UGS       | 0           | 0           | 0               | 0               |
| 3         | PCMM_1    | 0           | 0           | 0               | 0               |
| 4         |           | 0           | 0           | 0               | 0               |
| 5         |           | 0           | 0           | 0               | 0               |
| 6         |           | 0           | 0           | 0               | 0               |
| 7         |           | 0           | 0           | 0               | 0               |
| 8         |           | 0           | 0           | 0               | 0               |

[Table 47](#) describes the significant fields for the **show cable admission-control** command for upstream and downstream throughput.

**Table 47** *show cable admission-control Field Descriptions*

| Field       | Description                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------|
| Bucket No   | Specific bucket number.                                                                                    |
| Names       | Bucket name.                                                                                               |
| Minor Level | Minor threshold as currently defined in a percentage on the Cisco CMTS.                                    |
| # of Times  | Number of times traffic has crossed this threshold since the counters on the Cisco CMTS were last cleared. |

**Table 47** *show cable admission-control Field Descriptions (continued)*

| Field                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Major Level           | Major threshold as currently defined in a percentage on the Cisco CMTS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Excls Level           | Percentage of exclusive throughput that is reserved for the corresponding traffic type on the Cisco CMTS. Applies to downstream or upstream traffic.                                                                                                                                                                                                                                                                                                                                                                                                               |
| Non-Ex Level          | Percentage of non-exclusive throughput configured on the Cisco CMTS. Commonly used with Best Effort (lowest priority) traffic.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Curr Resv             | Percentage of throughput reserved exclusively for the corresponding flow type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Conf Level            | Configuration level that indicates the scope of configuration is actually applied for that US/ DS (whether the global, interface, or the upstream level is applied). The values in this field can be as follows: <ul style="list-style-type: none"> <li>• U—Upstream</li> <li>• I—Interface</li> <li>• G—Global</li> </ul>                                                                                                                                                                                                                                         |
| # of Rejec            | Number of rejections.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Sched Type            | Available for upstream only. This field displays the following information: <ul style="list-style-type: none"> <li>• UGS—UGS thresholds configured and traffic rates.</li> <li>• RTPS—RTPS thresholds configured and traffic rates.</li> <li>• BE—Best Effort thresholds configured and traffic rates.</li> </ul>                                                                                                                                                                                                                                                  |
| Flow Type             | Available for Downstream only. This field displays voice and data information: <ul style="list-style-type: none"> <li>• voice—Voice thresholds configured and traffic rates.</li> <li>• data—Data thresholds configured and traffic rates.</li> </ul>                                                                                                                                                                                                                                                                                                              |
| Class Name            | Available for upstream only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| CM-Registration event | Counter increments once for every cable modem that crosses a threshold during its registration. For example, if the minor, major, and critical thresholds on the Cisco CMTS are 60%, 70%, and 80% respectively, and a cable modem tries to register when the current value is 80%, then the cable modem is allowed to register, but the counters for minor, major and critical thresholds are each incremented by one.                                                                                                                                             |
| Voice-Call event      | Counter increments if the resource check fails when a voice-call is made. For example, assume both the MTAs are on the same Cisco CMTS, and minor, major, and critical thresholds for I/O memory are 50%, 60%, and 70%, respectively. Then assume the current I/O memory value is 75%. In this scenario, before the gate creation, AC performs an I/O memory check. This results in the counters for minor, major, and critical thresholds each being incremented by one, and the voice call fails. No packetcable gates are created because the voice calls fail. |

**Related Commands**

| Command                              | Description                                                                                              |
|--------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>cable admission-control</b>       | Configures the CPU and memory thresholds for the Cisco CMTS and supporting broadband processing engines. |
| <b>cable admission-control event</b> | Configures and enables AC event types.                                                                   |

| Command                                               | Description                                                                                                        |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>cable admission-control ds-bandwidth</b>           | Configures AC downstream bandwidth thresholds.                                                                     |
| <b>cable admission-control max-reserved-bandwidth</b> | Defines the maximum reserved bandwidth per bonding group for all service flows that are allowed by the Cisco CMTS. |
| <b>cable admission-control us-bandwidth</b>           | Configures AC upstream bandwidth thresholds.                                                                       |
| <b>clear cable admission control counters</b>         | Clears all AC resource counters.                                                                                   |
| <b>debug cable admission-control</b>                  | Enables automatic AC troubleshooting processes.                                                                    |

# show cable arp-filter

To display the total number of Address Resolution Protocol (ARP) replies and requests that have been sent and received, including the number of requests that have been filtered, use the **show cable arp-filter** command in privileged EXEC mode.

**show cable arp-filter cable** *slot/port* [**ip-requests-filtered** *number*] [**requests-filtered** *number* | **replies-filtered** *number*]

**show cable arp-filter cable** *slot/subslot/port* [**ip-requests-filtered** *number*] [**requests-filtered** *number* | **replies-filtered** *number*]

|                    |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>cable</b> <i>slot/port</i>                 | Displays information for all CMs on the specified cable interface and downstream port on the Cisco uBR7246VXR router.<br><br>On the Cisco uBR7246VXR router, <i>slot</i> can range from 3 to 6, and <i>port</i> can be 0 or 1, depending on the cable interface.                                                                                                                                                  |
|                    | <b>cable</b> <i>slot/subslot/port</i>         | Displays information for all CMs on the specified cable interface on the Cisco uBR10012 router. The following are the valid values: <ul style="list-style-type: none"> <li><i>slot</i> = 5 to 8</li> <li><i>subslot</i> = 0 or 1</li> <li><i>port</i> = 0 to 4 (depending on the cable interface)</li> </ul>                                                                                                      |
|                    | [ <b>ip-requests-filtered</b> <i>number</i> ] | (Optional) Displays the Service IDs (SIDs) that are generating or forwarding more filtered ARP requests for IP packets than the specified minimum <i>number</i> of packets. The valid range for <i>number</i> is 1 to 65535, with no default.<br><br><b>Note</b> This field shows the modems that are forwarding IP traffic that could be an part of an attack, such as TCP SYN floods, ping scans, and so forth. |
|                    | [ <b>requests-filtered</b> <i>number</i> ]    | (Optional) Displays the Service IDs (SIDs) that are generating or forwarding more filtered ARP requests than the specified minimum <i>number</i> of packets. The valid range for <i>number</i> is 1 to 65535, with no default.                                                                                                                                                                                    |
|                    | [ <b>replies-filtered</b> <i>number</i> ]     | (Optional) Displays the Service IDs (SIDs) that are generating or filtering more filtered ARP replies than the specified minimum <i>number</i> of packets. The valid range for <i>number</i> is 1 to 65535, with no default.                                                                                                                                                                                      |

Command Modes Privileged EXEC

|                 |              |                                                                                                                                                                |
|-----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command History | Release      | Modification                                                                                                                                                   |
|                 | 12.2(15)BC2  | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers.                                                           |
|                 | 12.2(15)BC2b | The <b>ip-requests-filtered</b> option was added to display the specific Service IDs (SIDs) that are generating or forwarding a minimum number of ARP packets. |



**Usage Guidelines**

The **cable arp filter** command enables the filtering of ARP request and reply packets on a cable interface. ARP packets might need to be filtered when a user on the cable network generates a large volume of ARP traffic as part of a theft-of-service or denial-of-service attack, or when a virus is using ARP requests to find other computers that it might infect.

The **show cable arp-filter** command displays the total number of ARP reply packets that have been received and the number of ARP request packets that have been sent on the cable interface, as well as the number of such packets that have been filtered.

**Tip**

To clear the counters on all interfaces, use the **clear counters** command. To clear the counters on a specific interface, use the **clear counters cable interface** command.

**Examples**

The following example shows the typical output from the **show cable arp-filter** command on a Cisco uBR10012 router. The displays for other Cisco CMTS platforms are similar.

```
Router# show cable arp-filter Cable5/0/0
```

```
ARP Filter statistics for Cable5/0/0:
```

```
Replies Rcvd: 177387 total, 1869 unfiltered, 8824 filtered
```

```
Requests Sent For IP: 68625 total, 964 unfiltered, 36062 filtered
```

```
Requests Forwarded: 7969175 total, 7213 unfiltered, 366167 filtered
```

```
Router#
```

[Table 0-48](#) describes the fields shown in the display.

**Table 0-48 show cable arp-filter Field Descriptions**

| Field                       | Description                                                                                                                                                                                                                                                      |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Replies Rcvd</b>         |                                                                                                                                                                                                                                                                  |
| Total                       | Total number of ARP reply packets received on the cable interface since power-on.                                                                                                                                                                                |
| Unfiltered                  | Number of ARP reply packets that the cable interface received and accepted while filtering was enabled using the <b>cable arp filter reply-accept</b> command.                                                                                                   |
| Filtered                    | Number of ARP reply packets that the cable interface dropped while filtering was enabled, because they would have otherwise exceeded the allowable threshold value that was configured for the interface using the <b>cable arp filter reply-accept</b> command. |
| <b>Requests Sent For IP</b> |                                                                                                                                                                                                                                                                  |
| Total                       | Total number of ARP request packets that the cable interface was asked to forward since power-on.                                                                                                                                                                |
| Unfiltered                  | Number of ARP request packets that the cable interface sent while filtering was enabled using the <b>cable arp filter request-send</b> command.                                                                                                                  |
| Filtered                    | Number of ARP request packets that the cable interface dropped, because they would have otherwise exceeded the allowable threshold value that was configured for the interface using the <b>cable arp filter request-send</b> command.                           |

**Table 0-48** *show cable arp-filter Field Descriptions (continued)*

| Field                                                                                                                                                                                             | Description                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Requests Forwarded</b>                                                                                                                                                                         |                                                                                                                                                                                                                                                          |
| Total                                                                                                                                                                                             | Total number of ARP request packets that the cable interface was asked to forward to the ARP proxy since power-on.                                                                                                                                       |
| Unfiltered                                                                                                                                                                                        | Number of ARP request packets that the cable interface sent to the ARP proxy while filtering was enabled using the <b>cable arp filter request-send</b> command.                                                                                         |
| Filtered                                                                                                                                                                                          | Number of ARP request packets for the ARP proxy that the cable interface dropped, because they would have otherwise exceeded the allowable threshold value that was configured for the interface using the <b>cable arp filter request-send</b> command. |
| <b>Note</b> All counters are 16-bit counters, with a maximum value of 65,535 packets. If the number of packets exceeds this amount, the counter wraps back to zero and begins incrementing again. |                                                                                                                                                                                                                                                          |

**Note**

The Total counts in the **show cable arp-filter** command continue to increment, regardless of whether ARP filtering has been enabled. The Unfiltered and Filtered counts increment only when ARP filtering has been enabled using the **cable arp filter** command. When cable ARP filtering is disabled, these counters retain their current values until manually reset, using the **clear counters** command.

The following example shows how to display the devices that are generating or filtering more than 100 ARP requests per reporting period. Repeat the command to see how quickly the device is generating ARP packets.

```
Router# show cable arp-filter c7/0/0 requests-filtered 100
```

| Sid | MAC Address    | IP Address | Req-Filtered | Req-For-IP-Filtered | Rep-Filtered |
|-----|----------------|------------|--------------|---------------------|--------------|
| 1   | 0006.2854.72d7 | 50.3.81.4  | 12407        | 0                   | 0            |

```
Router# show cable arp-filter c7/0/0 requests-filtered 100
```

| Sid | MAC Address    | IP Address | Req-Filtered | Req-For-IP-Filtered | Rep-Filtered |
|-----|----------------|------------|--------------|---------------------|--------------|
| 1   | 0006.2854.72d7 | 50.3.81.4  | 14597        | 0                   | 0            |

```
Router#
```

The following example shows how to display the devices that are generating or filtering more than 200 ARP replies per reporting period. Repeat the command to see how quickly the device is generating ARP packets.

```
Router# show cable arp-filter c5/0/0 replies-filtered 200
```

| Sid | MAC Address    | IP Address | Req-Filtered | Req-For-IP-Filtered | Rep-Filtered |
|-----|----------------|------------|--------------|---------------------|--------------|
| 2   | 0006.53b6.562f | 50.3.81.6  | 0            | 0                   | 2358         |

```
Router# show cable arp-filter c5/0/0 replies-filtered 200
```

| Sid | MAC Address    | IP Address | Req-Filtered | Req-For-IP-Filtered | Rep-Filtered |
|-----|----------------|------------|--------------|---------------------|--------------|
| 2   | 0006.53b6.562f | 50.3.81.6  | 0            | 0                   | 4016         |

```
Router#
```

The following example shows how to display the devices that are generating or filtering more than 10 ARP requests for IP packets per reporting period. Repeat the command to see how quickly the device is generating ARP packets.

```
Router# show cable arp-filter c3/0 ip-requests-filtered 10
```

| Sid | MAC Address    | IP Address | Req-Filtered | Req-For-IP-Filtered | Rep-Filtered |
|-----|----------------|------------|--------------|---------------------|--------------|
| 2   | 0006.2854.71e7 | 50.3.72.4  | 0            | 1926                | 0            |

```
Router#
```

Table 0-49 describes the fields shown in the display.

**Table 0-49** *show cable arp-filter Detail Field Descriptions*

| Field               | Description                                                                             |
|---------------------|-----------------------------------------------------------------------------------------|
| SID                 | Service ID (SID) of the device.                                                         |
| MAC Address         | Hardware (MAC-layer) address of the cable modem or CPE device.                          |
| IP Address          | IP address of the cable modem or CPE device.                                            |
| Req-Filtered        | Total number of ARP requests that the device has generated or forwarded.                |
| Req-For-IP-Filtered | Total number of ARP requests that the device has generated or forwarded for IP packets. |
| Rep-Filtered        | Total number of ARP replies that the device has generated or forwarded.                 |

**Note** The Req-Filter and Rep-Filtered counters are 16-bit counters, with a maximum value of 65,535 packets. If the number of packets exceeds this amount, the counter wraps back to zero and begins incrementing again.

### Clearing the ARP Packet Counters

The following example shows the cable ARP counters being cleared by the **clear counters cable interface** command. This can be useful because the ARP counters are 16-bit counters that can wrap around to zero relatively quickly when large amounts of ARP traffic is being generated. Also, the ARP packet counters could include SIDs that had forwarded large amounts of ARP traffic in the past, but that are not currently forwarding such traffic. Clearing the counters allows you to clearly see the SIDS that are currently forwarding the ARP traffic that is triggering the ARP filters.

```
Router# show cable arp cable 3/0
```

```
ARP Filter statistics for Cable3/0:
```

```
Replies Rcvd: 3278 total. 84 unfiltered, 3194 filtered
Requests Sent For IP: 941 total. 30 unfiltered, 911 filtered
Requests Forwarded: 941 total. 37 unfiltered, 904 filtered
```

```
Router# show cable arp-filter cable 5/1/0 requests-filtered 10
```

| Sid | MAC Address    | IP Address | Req-Filtered | Req-For-IP-Filtered | Rep-Filtered |
|-----|----------------|------------|--------------|---------------------|--------------|
| 1   | 0006.2854.72d7 | 10.3.81.4  | 8            | 0                   | 0            |
| 23  | 0007.0e02.b747 | 10.3.81.31 | 32           | 0                   | 0            |
| 57  | 0007.0e03.2c51 | 10.3.81.31 | 12407        | 0                   | 0            |
| ... |                |            |              |                     |              |
| 81  | 00C0.c726.6b14 | 10.3.81.31 | 23           | 0                   | 0            |

```
Router# clear counter cable 5/1/0
```

```
Clear "show interface" counters on this interface [confirm] y
```

```
08:17:53.968: %CLEAR-5-COUNTERS: Clear counter on interface Cable5/1/0 by console
```

## ■ show cable arp-filter

```
Router# show cable arp cable 5/1/0
```

```
ARP Filter statistics for Cable3/0:
```

```
Replies Rcvd: 0 total. 0 unfiltered, 0 filtered
Requests Sent For IP: 0 total. 0 unfiltered, 0 filtered
Requests Forwarded: 0 total. 0 unfiltered, 0 filtered
```

```
Router# show cable arp-filter cable 5/1/0 requests-filtered 10
```

```
Sid MAC Address IP Address Req-Filtered Req-For-IP-Filtered Rep-Filtered
```

```
Router# show cable arp-filter cable 5/1/0 requests-filtered 10
```

```
Sid MAC Address IP Address Req-Filtered Req-For-IP-Filtered Rep-Filtered
57 0007.0e03.2c51 10.3.81.31 20 0 0
81 00C0.c726.6b14 10.3.81.31 12 0 0
```

```
Router# show cable arp-filter cable 5/1/0 requests-filtered 10
```

```
Sid MAC Address IP Address Req-Filtered Req-For-IP-Filtered Rep-Filtered
57 0007.0e03.2c51 10.3.81.31 31 0 0
81 00C0.c726.6b14 10.3.81.31 18 0 0
```

```
Router#
```

**Note**

The **clear counters** command clears all of the packet counters on an interface, not just the ARP packet counters.

**Related Commands**

| Command                       | Description                                                                                           |
|-------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>cable arp</b>              | Activates cable Address Resolution Protocol (ARP).                                                    |
| <b>cable arp filter</b>       | Controls the number of ARP packets that are allowable for each Service ID (SID) on a cable interface. |
| <b>cable proxy-arp</b>        | Activates cable proxy ARP on the cable interface.                                                     |
| <b>clear arp</b>              | Clears the ARP table on the router.                                                                   |
| <b>clear counters</b>         | Clears the packet counters on all interfaces or on a specific interface.                              |
| <b>debug cable arp filter</b> | Displays debugging messages about the filtering of ARP broadcasts.                                    |

# show cable bgsync

To display the statistics when SNMP background synchronization occurs on the Cisco CMTS, use the **show cable bgsync** command in privileged EXEC mode.

## show cable bgsync

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no keywords or arguments. |
|---------------------------|--------------------------------------------|

|                        |       |
|------------------------|-------|
| <b>Command Default</b> | None. |
|------------------------|-------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.3(33)SCG    | This command was introduced. |

|                         |                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Use the <b>show cable bgsync</b> command to view the SNMP synchronization information. |
|-------------------------|----------------------------------------------------------------------------------------|

|                 |                                                                                                         |
|-----------------|---------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following is sample output of the <b>show cable bgsync</b> command on the cable interface at 8/0/0: |
|-----------------|---------------------------------------------------------------------------------------------------------|

```
Router# show cable bgsync

Background Sync is active, uptime is 28 minutes, 59 seconds.
Background Sync last active time is 200 seconds since CMTS bootup.
I-packet interval time is 1 day, P-packet interval time is 5 seconds.
Line Card with bg-sync: 5/0 6/0 7/1 8/0
Line Card working on I syncing:
Last clear cable bg sync counters Time:
Total bytes: 446239
Total background sync packets: 3584
 Ack packets: 2215
 Run Ctrl Msg packets: 4
 Data packets: 1365
Interval packets: 7377
 I Type packets: 794
 P Type packets: 6583
Mismatched packets: 0
Bg sync data IPC lost packets: 0
Router#
```

Table 77 describes the significant fields shown in the display.

**Table 50** *show cable bgsync Field Descriptions*

| Field                 | Description                                                                   |
|-----------------------|-------------------------------------------------------------------------------|
| I-packet interval     | Time interval of the packets sent from line card to the route processor (RP). |
| P-packet interval     | Time interval of the incremental packets sent from line card to the RP.       |
| Line Card with bgsync | Line card where the background synchronization is active                      |
| Mismatched Packets    | Packets that are of a different IPC version.                                  |

#### Related Commands

| Command                      | Description                                                               |
|------------------------------|---------------------------------------------------------------------------|
| <b>cable bgsync</b>          | Sets the data intervals for background synchronization on the Cisco CMTS. |
| <b>cable bgsync active</b>   | Activates background synchronization process on the Cisco CMTS.           |
| <b>clear bgsync counters</b> | Clears the background synchronization counters on the Cisco CMTS.         |

# show cable bundle

To display the forwarding table for the specified interface, use the **show cable bundle** in user EXEC or privileged EXEC mode.

## show cable bundle *n* forwarding-table

| Syntax Description | <i>n</i>         | Specifies the bundle identifier. Valid range is from 1 to 255. |
|--------------------|------------------|----------------------------------------------------------------|
|                    | forwarding-table | Displays the forwarding table for the specified interface.     |

| Command Modes | User EXEC or Privileged EXEC |
|---------------|------------------------------|
|---------------|------------------------------|

| Command History | Release                 | Modification                                                                                                                                                                                                                                                                                                                                                             |
|-----------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.0(7)XR2              | This command was introduced.                                                                                                                                                                                                                                                                                                                                             |
|                 | 12.0(8) SC              | This command was supported.                                                                                                                                                                                                                                                                                                                                              |
|                 | 12.1(2) EC1             | This command was supported.                                                                                                                                                                                                                                                                                                                                              |
|                 | 12.2(4)BC1              | Support was added to the Release 12.2 BC train.                                                                                                                                                                                                                                                                                                                          |
|                 | 12.1(13)EC, 12.2(11)BC1 | The Flags, Location, link, and sublink fields were added to the display to aid in debugging.                                                                                                                                                                                                                                                                             |
|                 | 12.3(21)BC              | All cable bundles are now automatically converted and configured to be in a virtual bundle, and standalone cable interfaces must be manually configured to be in a virtual bundle to operate properly. Previously, new virtual interface bundles and bundle members required reconfiguration, and there could also be standalone interfaces not part of a bundle at all. |

| Usage Guidelines | <ul style="list-style-type: none"> <li>Beginning with Cisco IOS Release 12.3(21)BC, all cable bundles are automatically converted and configured to be in a virtual bundle after loading the software image.</li> <li>In releases prior to Cisco IOS Release 12.3(21)BC, if you delete the virtual bundle interface, the virtual bundle disappears.</li> <li>Beginning with Cisco IOS Release 12.3(21)BC, standalone cable interfaces must be manually configured to be in a virtual bundle to operate properly.</li> <li>The virtual bundle interface accumulates the counters from members; counters on member links are not cleared when they are added to the bundle. If a bundle-only counter is desired, clear the bundle counter on the members before adding them to the bundle, or before loading the image (for Cisco IOS Release 12.3(21)BC and later).</li> </ul> |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Refer to the following document on Cisco.com for additional information about cable interface bundling and virtual interface bundling on the Cisco CMTS:

- Cable Interface Bundling and Virtual Interface Bundling on the Cisco CMTS*

| Examples | The following is a typical example of the <b>show cable bundle</b> command: |
|----------|-----------------------------------------------------------------------------|
|----------|-----------------------------------------------------------------------------|

```
Router# show cable bundle 1 forwarding-table
```

| MAC address    | Interface  | Flags | Location | link | sublink  |
|----------------|------------|-------|----------|------|----------|
| 00c0.5e01.0203 | Cable8/0/0 | 3     | 64E5BF60 | 0    | 64E5BE00 |
| 00c0.5e01.0203 | Cable7/0/0 | 3     | 64E5BE00 | 0    | 0        |
| 00c0.5e01.0101 | Cable8/0/0 | 3     | 64E5BEE0 | 0    | 64E5BE40 |
| 00c0.5e01.0101 | Cable7/0/0 | 3     | 64E5BE40 | 0    | 0        |
| 00c0.a375.cc1c | Cable8/0/0 | 1     | 64E5BEC0 | 0    | 0        |
| 00c0.0e01.a835 | Cable8/0/0 | 1     | 64E5BEA0 | 0    | 0        |

## ■ show cable bundle

```

00c0.0e01.a799 Cable8/0/0 1 64E5BDE0 0 0
00c0.0e01.a405 Cable8/0/0 1 64E5BF00 0 0
00c0.0e01.a5d1 Cable7/0/0 1 64E5BE20 0 0
00c0.0e01.a5d9 Cable8/0/0 1 64E5BE60 0 0
00c0.0e01.a5e1 Cable7/0/0 1 64E5BF40 0 0
00c0.0e01.a5f1 Cable7/0/0 1 64E5BE80 0 0
00c0.0eb4.0a41 Cable5/0/0 1 63704D1C 0 0
00c0.f03b.ed59 Cable6/1/0 1 6370427C 0 0
00c0.f03b.ed97 Cable6/1/0 1 63703F3C 0 0
00c0.0eb4.1373 Cable5/0/0 1 6370479C 0 0
00c0.f03b.edd3 Cable6/1/0 1 637042BC 0 0
00c0.7371.6df6 Cable5/0/0 1 63703DFC 0 0

```

Table 0-51 describes the fields shown in the **show cable bundle** command display.

**Table 0-51** *show cable bundle Command Field Descriptions*

| Field       | Description                                                                                                                                                                                                                                                                                                                                                                      |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC address | Identifies the MAC (hardware) address for each interface in the bundle.                                                                                                                                                                                                                                                                                                          |
| Interface   | Identifies the cable interface slot and port number.                                                                                                                                                                                                                                                                                                                             |
| Flag        | The current value of the flag byte for this bundle entry. The following bits can be set: <ul style="list-style-type: none"> <li>• Bit 0 (0x01) = Bundle is active.</li> <li>• Bit 1 (0x02) = Bundle is a static multicast group.</li> </ul> <p><b>Note</b> If more than one bit is set, add the values together. For example, 3 indicates an active, static multicast group.</p> |
| Location    | The location in the router's memory for the flags byte for this bundle entry. This value is useful only to TAC engineers during debugging.                                                                                                                                                                                                                                       |
| link        | The value of the link pointer for this bundle entry. This value is useful only to TAC engineers during debugging.                                                                                                                                                                                                                                                                |
| sublink     | The value of the sublink pointer for this bundle entry. This value is useful only to TAC engineers during debugging.                                                                                                                                                                                                                                                             |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

The following example shows typical output for the **show cable bundle forwarding-table** command, supporting virtual interface bundling on the Cisco CMTS in later 12.3 BC Cisco IOS releases:

Router# **show cable bundle 1 forwarding-table**

```

MAC address Interface Flags Location link sublink
00c0.5e01.0203 Cable8/0/0 3 64E5BF60 0 64E5BE00
00c0.5e01.0203 Cable7/0/0 3 64E5BE00 0 0
00c0.5e01.0101 Cable8/0/0 3 64E5BEE0 0 64E5BE40
00c0.5e01.0101 Cable7/0/0 3 64E5BE40 0 0
00c0.a375.cc1c Cable8/0/0 1 64E5BEC0 0 0
00c0.0e01.a835 Cable8/0/0 1 64E5BEA0 0 0
00c0.0e01.a799 Cable8/0/0 1 64E5BDE0 0 0
00c0.0e01.a405 Cable8/0/0 1 64E5BF00 0 0
00c0.0e01.a5d1 Cable7/0/0 1 64E5BE20 0 0
00c0.0e01.a5d9 Cable8/0/0 1 64E5BE60 0 0
00c0.0e01.a5e1 Cable7/0/0 1 64E5BF40 0 0
00c0.0e01.a5f1 Cable7/0/0 1 64E5BE80 0 0

```



```

00c0.0eb4.0a41 Cable5/0/0 1 63704D1C 0 0
00c0.f03b.ed59 Cable6/1/0 1 6370427C 0 0
00c0.f03b.ed97 Cable6/1/0 1 63703F3C 0 0
00c0.0eb4.1373 Cable5/0/0 1 6370479C 0 0
00c0.f03b.edd3 Cable6/1/0 1 637042BC 0 0
00c0.7371.6df6 Cable5/0/0 1 63703DFC 0 0

```

```

Total = 18, sublink total = 2
Free = 1016, low_mark = 1016

```

| Related Commands | Command                        | Description                                                                                                                                                 |
|------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable bundle</b>            | Creates an interface bundle.                                                                                                                                |
|                  | <b>show ip interface brief</b> | Displays a brief summary of an interface's IP information and status, to include virtual interface bundle information.                                      |
|                  | <b>show pxf cable</b>          | Displays multicast echo, packet intercept, or source-verify features for one or all cable interfaces, to include information for virtual interface bundles. |

# show cable bundle multicast

To display Multicast information for the specified virtual interface bundle, based on IGMPv3, use the **show cable bundle multicast** command in privileged EXEC mode:

```
show cable bundle bundle# multicast group
```

```
show cable bundle bundle# multicast [MAC addr | IP addr]
```

|                           |                 |                                                                               |
|---------------------------|-----------------|-------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>bundle#</i>  | The alphanumeric identifier for the virtual interface bundle.                 |
|                           | <i>group</i>    | Multicast group membership identifier.                                        |
|                           | <i>MAC addr</i> | Optional parameter specifies the MAC address for which to return information. |
|                           | <i>IP addr</i>  | Optional parameter specifies the IP address for which to return information.  |

**Command Modes** User EXEC or Privileged EXEC

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.3(21)BC     | This command was introduced to support virtual interface bundling on the Cisco CMTS. All cable bundles are now automatically converted and configured to be in a virtual bundle, and standalone cable interfaces must be manually configured to be in a virtual bundle to operate properly. Previously, new virtual interface bundles and bundle members required reconfiguration, and there could also be standalone interfaces not part of a bundle at all. |

- Usage Guidelines**
- Beginning with Cisco IOS Release 12.3(21)BC, all cable bundles are automatically converted and configured to be in a virtual bundle after loading the software image.
  - In releases prior to Cisco IOS Release 12.3(21)BC, if you delete the virtual bundle interface, the virtual bundle disappears.
  - Beginning with Cisco IOS Release 12.3(21)BC, standalone cable interfaces must be manually configured to be in a virtual bundle to operate properly.
  - The virtual bundle interface accumulates the counters from members; counters on member links are not cleared when they are added to the bundle. If a bundle-only counter is desired, clear the bundle counter on the members before adding them to the bundle, or before loading the image (for Cisco IOS Release 12.3(21)BC and later).

Refer to the following document on Cisco.com for additional information about cable interface bundling and virtual interface bundling on the Cisco CMTS:

- Cable Interface Bundling and Virtual Interface Bundling on the Cisco CMTS*

**Examples** The following example illustrates this new command. This command translates the bundle's multicast MAC address to Multicast IP address information, including the associated multicast source.

```
Router# show cable bundle bundle1.1 multicast
```

| CableBundle | Interface | Source IP | Multicast IP | MAC Address    |
|-------------|-----------|-----------|--------------|----------------|
| 1           | Bundle1.1 | *         | 230.1.1.1    | 0100.5e00.0001 |

The following example illustrates multicast information for the specified virtual bundle:

```
Router# sh cable bundle 1 multicast
CableBundle Interface Source IP Multicast IP MAC Address
1 Bundle1 * 239.0.0.100 0100.5e00.0001
```

To translate a MAC address back to Multicast IP address, use the following optional syntax:

**show cable bundle *bundle#* multicast [ <MAC addr | IP addr >]**

The following example illustrates this enhanced **show** command:

```
Router# show cable bundle bundleID multicast 0100.5e00.0001
MAC address Interface Flags Location link sublink
0100.5e00.0001 Bundle1 1 646FE4D8 0 646FE4EC
0100.5e00.0001 Cable6/0/0 1 646FE4EC 0 0
^^^^^^^^^^^^^^
```

| Related Commands | Command                        | Description                                                                                                                                                 |
|------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable bundle</b>            | Creates an interface bundle.                                                                                                                                |
|                  | <b>show ip interface brief</b> | Displays a brief summary of an interface's IP information and status, to include virtual interface bundle information.                                      |
|                  | <b>show pxf cable</b>          | Displays multicast echo, packet intercept, or source-verify features for one or all cable interfaces, to include information for virtual interface bundles. |

# show cable burst-profile

To display the upstream data burst profiles used to configure the upstream PHY, use the **show cable burst-profile** command in privileged EXEC mode.

## show cable burst-profile



### Note

This command has been deprecated and removed in the current versions of the Cisco IOS software for all Cisco CMTS routers.

### Syntax Description

This command has no arguments or keywords.

### Command Modes

Privileged EXEC

### Command History

| Release                                     | Modification                                                                                 |
|---------------------------------------------|----------------------------------------------------------------------------------------------|
| 11.3 NA                                     | This command was introduced.                                                                 |
| 11.3(5)NA, 12.0(5)T1, 12.0(6)SC, 12.1(2)EC1 | This command was removed and replaced with the <b>show cable modulation-profile</b> command. |

### Usage Guidelines

This command displayed configuration of the cable burst profiles, which were what DOCSIS initially used to control the data, ranging, and station maintenance bursts. The Cisco CMTS routers now support a more comprehensive set of modulation profiles, which are displayed by the **show cable modulation-profile** command.



### Note

The **show cable burst-profile** command displayed fields and values that were supported only in the initial versions of the DOCSIS specification. The current DOCSIS 1.0 and 1.1 specifications use different parameters and values, as shown by the **show cable modulation-profile** command.

### Examples

The following example shows typical output from the **show cable burst-profile** command:

```
Router# show cable burst-profile
```

| Burst number | Type | Preamb | Diff | FEC err | FEC length | Scrambl | Max size | Guard size | Last shortened | Scrambl profile |
|--------------|------|--------|------|---------|------------|---------|----------|------------|----------------|-----------------|
| 1            | 1    | 48     | no   | 0x0     | 0x6        | 0x152   | 1        | 16         | 1              | yes             |
| 2            | 1    | 48     | no   | 0x0     | 0x6        | 0x152   | 1        | 12         | 1              | no              |
| 3            | 1    | 48     | no   | 0x5     | 0x2C       | 0x152   | 0        | 48         | 1              | yes             |
| 4            | 1    | 48     | no   | 0x5     | 0x2C       | 0x152   | 0        | 48         | 1              | yes             |
| 5            | 1    | 48     | no   | 0x5     | 0x32       | 0x152   | 0        | 20         | 1              | yes             |
| 6            | 1    | 48     | no   | 0x0     | 0x32       | 0x152   | 0        | 20         | 1              | no              |

```
Router#
```

Table 0-52 describes the fields shown in the **show cable burst-profile** command display.

**Table 0-52 show cable burst-profile Field Descriptions**

| Field                   | Description                                                |
|-------------------------|------------------------------------------------------------|
| Burst profile number    | The number of the burst profile.                           |
| Type                    | Type of burst profile.                                     |
| Preamb length           | Length of the preamble.                                    |
| Diff encode             | Shows if there is a diff encode.                           |
| FEC err correct         | Shows the forward error correction.                        |
| FEC codeword length     | Shows the length of the forward error correction codeword. |
| Scrambl seed            | Shows the seed of the scrambler.                           |
| Max size                | Designates the maximum burst size.                         |
| Guard size              | Indicates the guard time size.                             |
| Last codeword shortened | Shows the last codeword shortened.                         |
| Scrambl                 | Indicates whether scramble is enabled (yes) or not (no).   |



**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

#### Related Commands

| Command                                  | Description                                               |
|------------------------------------------|-----------------------------------------------------------|
| <b>cable upstream modulation-profile</b> | Configures a spectrum group to use a specified frequency. |
| <b>show cable hop</b>                    | Displays CM configuration settings.                       |
| <b>show cable modulation-profile</b>     | Displays the currently defined modulation profiles.       |
| <b>show interface cable sid</b>          | Displays cable interface information.                     |

# show cable calls

To display voice call history information and status for PacketCable Emergency 911 Services Listing and History, use the **show cable calls** command in privileged EXEC mode. This command displays voice call history information that is enabled with the **cable high-priority-call-window** command in global configuration mode.

```
show cable calls show cable calls [interface cslot | slot/subslot]
```

|                    |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>interface</b>           | Selects the interface for which to enable PacketCable E911 call history.                                                                                                                                                                                                                                                                                                                                                            |
|                    | <i>slot   slot/subslot</i> | Designates the slot or slot and port for a particular cable interface on the Cisco router.<br><br>The following are the valid values for the Cisco uBR7246VXR router: <ul style="list-style-type: none"> <li><i>slot</i> can range from 3 to 6</li> </ul> The following are the valid values for the Cisco uBR10012 router: <ul style="list-style-type: none"> <li><i>slot</i> = 5 to 8</li> <li><i>subslot</i> = 0 or 1</li> </ul> |

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |                |                                                                                                                                                                                                                           |
|-----------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                       |
|                 | 12.3(13a)BC    | This command was introduced supporting PacketCable Emergency 911 Services Listing and History on the Cisco CMTS: <ul style="list-style-type: none"> <li>Cisco uBR7246VXR router</li> <li>Cisco uBR10012 router</li> </ul> |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | <p>This command supports the PacketCable Emergency 911 Services Listing and History feature on the Cisco CMTS. Cisco IOS release 12.3(13a)BC introduces enhanced informational support for PacketCable Emergency 911 calls on the Cisco CMTS, to include the following information and related history:</p> <ul style="list-style-type: none"> <li>active Emergency 911 calls</li> <li>recent Emergency 911 calls</li> <li>regular voice calls</li> <li>voice calls made after recent Emergency 911 calls</li> </ul> <p>To set the call window (in minutes) during which the Cisco CMTS maintains records of Emergency 911 calls, use the <b>cable high-priority-call-window</b> command in global configuration mode. To remove the call window configuration from the Cisco CMTS, use the <b>no</b> form of this command:</p> <pre>cable high-priority-call-window minutes no cable high-priority-call-window</pre> |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The following command example configures the call window on the Cisco uBR10012 router to be one minute in length:

```
Router(config)# cable high-priority-call-window 1
```

Additional information for voice call support with PacketCable and PacketCable MultiMedia (PCMM) is available in the following document on Cisco.com:

- *PacketCable and PacketCable Multimedia for the Cisco CMTS*

## Examples

The following example illustrates call status on the Cisco CMTS:

```
Router# show cable calls
```

| Interface | ActiveHiPriCalls | ActiveAllCalls | PostHiPriCallCMs | RecentHiPriCMs |
|-----------|------------------|----------------|------------------|----------------|
| Cable3/0  | 0                | 0              | 0                | 1              |
| Cable3/1  | 0                | 0              | 0                | 0              |
| Cable4/0  | 0                | 0              | 0                | 1              |
| Cable4/1  | 0                | 0              | 0                | 0              |
| Total     | 0                | 0              | 0                | 2              |
| Router #  |                  |                |                  |                |

The following command example illustrates that one Emergency 911 call was made on the Cable8/1/1 interface on the Cisco uBR10012 router during the window set for high priority calls:

```
Router# show cable calls
```

| Interface  | ActiveHiPriCalls | ActiveAllCalls | PostHiPriCallCMs | RecentHiPriCMs |
|------------|------------------|----------------|------------------|----------------|
| Cable5/0/0 | 0                | 0              | 0                | 0              |
| Cable5/0/1 | 0                | 0              | 0                | 0              |
| Cable5/1/0 | 0                | 0              | 0                | 0              |
| Cable5/1/1 | 0                | 0              | 0                | 0              |
| Cable5/1/2 | 0                | 0              | 0                | 0              |
| Cable5/1/3 | 0                | 0              | 0                | 0              |
| Cable5/1/4 | 0                | 0              | 0                | 0              |
| Cable6/0/0 | 0                | 0              | 0                | 0              |
| Cable6/0/1 | 0                | 0              | 0                | 0              |
| Cable7/0/0 | 0                | 0              | 0                | 0              |
| Cable7/0/1 | 0                | 0              | 0                | 0              |
| Cable8/1/0 | 0                | 0              | 0                | 0              |
| Cable8/1/1 | 1                | 1              | 0                | 0              |
| Cable8/1/2 | 0                | 0              | 0                | 0              |
| Cable8/1/3 | 0                | 0              | 0                | 0              |
| Cable8/1/4 | 0                | 0              | 0                | 0              |
| Total      | 1                | 1              | 0                | 0              |

## Related Commands

| Command                                | Description                                                                                             |
|----------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>cable high-priority-call-window</b> | Sets the call window (in minutes) during which the Cisco CMTS maintains records of Emergency 911 calls. |
| <b>show cable modem calls</b>          | Displays voice call information for a particular cable modem.                                           |

# show cable cgd-associations

To display the Channel Group Domain (CGD) downstream associations on the Cisco CMTS, use the **show cable cgd-associations** command in privileged EXEC mode.

**show cable cgd-associations**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC(#)

| Command History | Release      | Modification                                                     |
|-----------------|--------------|------------------------------------------------------------------|
|                 | 12.2(33)SCG  | This command was introduced.                                     |
|                 | 12.2(33)SCG4 | This command was modified. The output field Active Remote DS was |
|                 | 12.2(33)SCH  | modified to Active DS                                            |

**Examples** The following is a sample output of the **show cable cgd-associations** command displaying the Cisco Wideband SPA downstream association with Cisco uBR-MC3GX60V and Cisco uBR-MC20X20V line cards:

Router# **show cable cgd-associations**

| CGD Host | Resource | DS Channels | Upstreams (AllUS) | Active DS |
|----------|----------|-------------|-------------------|-----------|
| Ca8/1/0  | 1/0/0    | 0-3         | 0-3 Yes           | 0-3       |
| Ca8/1/1  | 8/1/1    | 0           | 0-3 Yes           |           |
| Ca8/1/2  | 8/1/2    | 0           | 0-3 Yes           |           |
| Ca8/1/3  | 8/1/3    | 0           | 0-3 Yes           |           |
| Ca8/1/4  | 8/1/4    | 0           | 0-3 Yes           |           |



**Note** In the AllUS field, *Yes* indicates all the upstream channels are associated with the downstream channels in the MAC domain. If the AllUS field is blank, all the upstream channels are not associated with the downstream channels.

[Table 1](#) describes the fields shown in the **show cable cgd-associations** command display.



**Table 53** *show cable cgd-associations Field Descriptions*

| Field            | Description                                                                                                                                                              |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CGD Host         | MAC domain interface for CGD.                                                                                                                                            |
| Resource         | Downstream cable interface line card.                                                                                                                                    |
| DS Channels      | Downstream RF channels.                                                                                                                                                  |
| Upstreams        | Association of upstream channels in the MAC domain.                                                                                                                      |
| (AllUS)          | Association of all upstream channels with downstream channels in the MAC domain.                                                                                         |
| Active Remote DS | Active downstream channels.<br>Starting with Cisco IOS Release 12.2(33)SCG4 and Cisco IOS Release 12.2(33)SCH, the field name Active Remote DS is modified to Active DS. |
| Active DS        | Active downstream channels.                                                                                                                                              |

**Related Commands**

| Command                                                                      | Description                                                                                    |
|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>show cable mac-domain cable cgd-associations</b>                          | Displays the summary of the CGD associations for all cable MAC domains.                        |
| <b>show cable mac-domain cable <i>slot/port</i> downstream-service-group</b> | Displays the MAC Domain Downstream Service Group information for a primary downstream channel. |

# show cable clock

To display clock reference status information for the clock card and to display information about displaying Timing, Communication and Control (TCC) card DOCSIS Timing Interface (DTI) client and server statistic counts, use the **show cable clock** command in user EXEC or privileged EXEC mode.

**show cable clock** [*slot*] { **client** *port id* | **server** *port id* | **counters** }

| Syntax Description           |                                                                                                  |  |
|------------------------------|--------------------------------------------------------------------------------------------------|--|
| <i>slot</i>                  | (Optional) Identifies a TCC interface on the Cisco RF Gateway 10. Valid TCC slots are 13 and 14. |  |
| <b>client</b> <i>port id</i> | Specifies the DTI client port ID. Valid port values are 1 and 2.                                 |  |
| <b>server</b> <i>port id</i> | Specifies the DTI server port ID. Valid port values are 1 and 2.                                 |  |
| <b>counters</b>              | Specifies the DTI client counters.                                                               |  |

**Command Default** Information on the TCC DTI client and server is displayed. Counters are not displayed.

**Command Modes** User EXEC or Privileged EXEC

| Command History | Release                   | Modification                                                                                                                                                                            |
|-----------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(1a)T1                | This command was introduced.                                                                                                                                                            |
|                 | 12.1(2)EC1                | This command was supported on the EC train.                                                                                                                                             |
|                 | 12.2(1)XF1,<br>12.2(4)BC1 | This command was supported for the Cisco uBR10012 universal broadband router.                                                                                                           |
|                 | 12.3(23)BC                | This command was supported for DTI mode.                                                                                                                                                |
|                 | 12.2(44)SQ                | This command was modified in Cisco IOS Release 12.2(44)SQ to support the Cisco RF Gateway 10. The <i>slot</i> , <b>client</b> , <b>server</b> , and <b>counters</b> options were added. |

**Usage Guidelines** This command supports the Cisco CMTS clock feature set, which provides a synchronized clock for improved Voice-over-IP (VoIP) operations. The clock feature set requires one of the following configurations:

- A Cisco uBR10012 router with one or two TCC+ cards that are connected to an external national clock source.



**Note** Beginning in Cisco IOS Release 12.3(23)BC, TCC+ is replaced with DOCSIS Timing and Control Card (DTCC).

- A Cisco uBR7246 VXR router using a Cisco uBR-MC16S, Cisco uBR-MC16E, Cisco uBR-MC28C, or Cisco uBR-MC28C-BNC cable interface line card. The router must also be equipped with a Cisco cable clock card and be running Cisco IOS 12.1(1a)T1, 12.1(2)EC1, or a later release. The Cisco cable clock card should be connected to an external national clock source.

Only these cable interface cards support the external clock card reference from a clock card to distribute that signal to CMs or set-top boxes (STBs) attached to the specific network segments. You can use other cable interface cards, such as the Cisco uBR-MC16C, with the clock card, but these other cable interfaces will not synchronize their downstream SYNC messages with the external clock source.

Each CM or STB must also support VoIP applications and the clock feature set. For example, the Cisco uBR924, running Cisco IOS Release 12.0(7)T or later, supports clock card feature automatically.

**Note**

This command does not appear if a clock card is not installed in the system.

**Examples**

The following sample output from the **show cable clock** command on a Cisco uBR7246VXR router shows that both external sources are available and the clock card is providing the clock reference:

```
Router# show cable clock

Clockcard primary input is present
Clockcard secondary input is present
Cable clock reference is clockcard primary input

Cable3/0 Timestamp clock reference is from Clockcard
Cable4/0 Timestamp clock reference is from Clockcard
```

The following sample output from the **show cable clock** command on a Cisco uBR10012 router shows that both external sources are available and that the TCC+ card in slot 1/1 is providing the clock reference:

```
Router# show cable clock
Number of TCCplus Cards in the Chassis: 2
Active TCCplus Card is in slot: 1 subslot: 1
Backup TCCplus Card is in slot: 2 subslot: 1
Clock reference used by the active card is Primary T1

External T1 References:
Card: 1/1
Primary T1 : Available
Secondary T1: Available

Card: 2/1
Primary T1 : Available
Secondary T1: Available
```

The following sample output from the **show cable clock** command on a Cisco uBR10012 router shows that the TCC+ card in slot 1/1 is in maintenance mode, and that the TCC+ card in slot 2/1 is providing the clock reference:

```
Router# show cable clock
Number of TCCplus Cards in the Chassis: 2
TCCplus card in 1/1 under maintenance
Active TCCplus Card is in slot: 2 subslot: 1
Clock reference used by the active card is Primary T1

External T1 References:
Card: 2/1
Primary T1 : Available
Secondary T1: Available
```

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

The following sample output from the **show cable clock** command on a Cisco uBR10012 router shows that the DTCC card in slot 1/1 is in DTI mode.

```
Router# show cable clock

Number of TCC Cards in the Chassis: 1
Active TCC Card is in slot: 1 subslot: 1, (DTCC Eightbells card)
Clock reference used by the active card is DTI
Active TCC card in slot 1/1
TCC Card 1/1 DTI status:

 Active Client port : 2
 Active Client status : normal
 Active Client Server status : freerun
 Active Client frame error rate : < 2%
 Active Client CRC error count : 0xAD
 Standby Client Signal detected : yes
No card in slot 2/1
```

**Cisco RF Gateway 10**

The following example shows the TCC DTI client and server statistic counts information:

```
Router# show cable clock
DTI Client status: TCC 13

Client status : normal
Client clock type : ITU type 1
Client firmware version : 7
Client dti version : 0
Client timestamp : 657519453
Client phase correction : 65535
Client normal time : 65535
Client holdover time : 0
Client transition t3 count : 0
Client transition t4 count : 1
Client transition t6 count : 0
Client transition t7 count : 0
Client port switch count : 1
Client Integral Frequency Term : 64518
Client EFC Value : 63282

DTI Client Port 1 Status:

 Port Status : Active
 Signal detected : yes
 CRC error count : 2
 Frame error rate : < 2%
 Cable advance : 2560

 -- Connected server information --
 Server status : Active free-run
 Root Server clock type : ITU type 3
 Root Server source : none
 Server Type : Root
 Client Performance Stable : yes
 Client Cable advance Valid : yes
```

```

DTI Client Port 2 Status:

Port Status : Inactive
Signal detected : no
CRC error count : 66
Frame error rate : > 5%
Cable advance : 0

DTI Client status: TCC 14

Client status : normal
Client clock type : ITU type 1
Client firmware version : 7
Client dti version : 0
Client timestamp : 672169320
Client phase correction : 65535
Client normal time : 65535
Client holdover time : 0
Client transition t3 count : 0
Client transition t4 count : 1
Client transition t6 count : 0
Client transition t7 count : 0
Client port switch count : 1
Client Integral Frequency Term : 64760
Client EFC Value : 63832

DTI Client Port 1 Status:

Port Status : Inactive
Signal detected : no
CRC error count : 26
Frame error rate : > 5%
Cable advance : 0

DTI Client Port 2 Status:

Port Status : Active
Signal detected : yes
CRC error count : 2
Frame error rate : < 2%
Cable advance : 1792

-- Connected server information ---
Server status : Active free-run
Root Server clock type : ITU type 3
Root Server source : none
Server Type : Root
Client Performance Stable : yes
Client Cable advance Valid : yes

```

The following is sample output of a TCC card in slot 13 on a Cisco RF Gateway 10:

```

Router#show cable clock 13 client 1
DTI Client Port 1 Status:

Port Status : Inactive
Signal detected : no
CRC error count : 63006
Frame error rate : > 5%
Cable advance : 0x0000

```

Table 54 describes the significant fields shown in the display.

**Table 54** *show cable clock client Field Descriptions*

| Field           | Description                                                                                                                           |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Port status     | Indicates the current status of the DTI port on the TCC card.                                                                         |
| Signal detected | Indicates whether the DTI signal was detected.                                                                                        |
| CRC error count | The number of cyclic redundancy check (CRC) errors. It can indicate intermittent upstream, laser clipping, or common-path distortion. |

The following example shows the server status of the TCC card in slot 13 on a Cisco RFGW-10:

```
Router#show cable clock 13 server 2
TCC Card 13 port 2 DTI Server status:

Server signal detected : yes
Server status : free-run
Root Server clock type : ITU type 3
Root Server source : none
Server Type : Root
Client Performance Stable : yes
Client Cable advance Valid : yes
TOD Setting Mode : Short
TOD gpssec : 902825745
TOD leap seconds : 14
```

Table 55 describes the significant fields shown in the display.

**Table 55** *show cable clock server Field Descriptions*

| Field                  | Description                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Server signal detected | Indicates whether the server was detected.                                                                                                   |
| Server status          | Indicates the state in which the server is functioning. The states are warm-up, free-run state, fast mode, normal, holdover, or bridge mode. |
| Root server source     | The server source such as internal, external, GPS or none.                                                                                   |
| Root server clock type | The clock type. The types are 1, 2, 3 or ITU Stratum 3 or DTI Min. clock.                                                                    |
| TOD setting mode       | Displays the time (user time, NTP, GPS) mode such as short or long.                                                                          |

The following is a sample output showing the counters on TCC card 13 on Cisco RFGW-10:

```
Router#show cable clock 13 counters
TCC Card 13 DTI counters:

Client Normal time : 0x1EB6
Client Holdover time : 0x0000
Client Phase Correction : 0
Client Freq Correction : 63213
Client EFC Correction : 61039
Client transition count t3 : 0
Client transition count t4 : 1
```

```
Client transition count t6 : 0
Client transition count t7 : 0
Client port switch count : 1
```

## Related Commands

| Command                                 | Description                                                                                    |
|-----------------------------------------|------------------------------------------------------------------------------------------------|
| <b>show controllers clock-reference</b> | Displays hardware information, register values, and current counters for the cable clock card. |
| <b>show cable clock dti status</b>      | Displays information on the DOCSIS Timing Interface (DTI) Client status.                       |
| <b>cable clock free-run</b>             | Allows the clock to be in free-run mode.                                                       |
| <b>clear cable clock counters</b>       | Clears DTI client transition counters of a TCC DTI client and server.                          |

# show cable clock dti counters

To display DTI counters for the clock card, use the **show cable clock dti counters** command in user EXEC or privileged EXEC mode.

**show cable clock dti counters** *slot/subslot*

|                    |                     |                                                                                         |
|--------------------|---------------------|-----------------------------------------------------------------------------------------|
| Syntax Description | <i>slot/subslot</i> | Specifies the slot and subslot location of the DTCC ports. Valid values are 1/1 or 2/1. |
|--------------------|---------------------|-----------------------------------------------------------------------------------------|

|                |                              |
|----------------|------------------------------|
| Command Modes. | User EXEC or Privileged EXEC |
|----------------|------------------------------|

| Command History | Release    | Modification                             |
|-----------------|------------|------------------------------------------|
|                 | 12.3(23)BC | This command was supported for DTI mode. |

Examples

The following is a sample output from the **show cable clock dti counters** command in user EXEC mode:

```
Router> show cable clock dti counters 1/1
TCC Card 1/1 DTI counters:

Client Normal time : 0xFFFF
Client Holdover time : 0x0000
Client Phase Correction : 0x0000
Client Freq Correction : 0xFBD7
Client EFC Correction : 0xF7AD
Client transition count t3 : 0x00
Client transition count t4 : 0x01
Client transition count t6 : 0x00
Client transition count t7 : 0x00
```

| Related Commands | Command                               | Description                                                                                   |
|------------------|---------------------------------------|-----------------------------------------------------------------------------------------------|
|                  | <b>cable clock dti clear-counters</b> | Resets the counters that are displayed with the <b>show cable clock dti counters</b> command. |
|                  | <b>show cable clock dti status</b>    | Displays information on the DOCSIS Timing Interface (DTI) Client status.                      |



# show cable clock dti status

To display information on the DOCSIS Timing Interface (DTI) Client status, use the **show cable clock dti status** command in privileged EXEC mode.

## show cable clock dti status

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

|                        |                |                                                            |
|------------------------|----------------|------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                        |
|                        | 12.3(23)BC     | This command was introduced for the Cisco uBR10012 router. |

|                         |                                                                   |
|-------------------------|-------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Use this command to display information on the DTI Client status. |
|-------------------------|-------------------------------------------------------------------|

|                 |                                                                                |
|-----------------|--------------------------------------------------------------------------------|
| <b>Examples</b> | The following is a sample output from the <b>show cable clock dti</b> command: |
|-----------------|--------------------------------------------------------------------------------|

```
Router# show cable clock dti status
Status of DTI component:
Active TCC card in slot 1/1
TCC Card 1/1 DTI status:

Active Client port : 2
Active Client status : normal
Active Client Server status : freerun
Active Client frame error rate : < 2%
Active Client CRC error count : 0x06
Standby Client Signal detected : no

No card in slot 2/1
```

|                         |                  |                                                                 |
|-------------------------|------------------|-----------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>   | <b>Description</b>                                              |
|                         | show cable clock | Displays clock reference status information for the clock card. |

# show cable device access-group

To display a list of CMs and their customer premises equipment (CPE) devices, along with their access groups, use the **show cable device access group** command in privileged EXEC mode.

**show cable device** [*ip-address*] **access-group**



## Note

The **show cable device access-group** command is not supported on the Cisco uBR10012 universal broadband router.

## Syntax Description

*ip-addr* (Optional) Specifies the IP address for a particular CM or host.

## Command Modes

Privileged EXEC

## Command History

| Release     | Modification                                                                                                                                                                                              |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.NA       | This command was introduced.                                                                                                                                                                              |
| 12.1(3a)EC1 | Support was added to the Release 12.1 EC train.                                                                                                                                                           |
| 12.2(4)BC1  | Support was added to the Release 12.2 BC train for the Cisco uBR7100 series and Cisco uBR7200 series routers. (This command might appear in the CLI for the Cisco uBR10012 router but is not functional.) |

## Usage Guidelines

This command displays information about both CMs and their associated CPE devices. To display information only for hosts and other CPE devices, use the **show cable host access-group** command. To display information only for CMs, use the **show cable modem access-group** command.

If an SNMP manager is requesting information about CM or CPE devices at the same time that this command is given, the command displays the following error message:

No information is available, please try later.

Wait until the SNMP retrieval is done and retry the CLI command.

## Examples

The following example shows how to display a list of the CMs and their hosts:

Router# **show cable device access-group**

| MAC address    | IP address     | Type  | Access-group |
|----------------|----------------|-------|--------------|
| 00d0.ba77.7595 | 10.20.114.34   | modem | resident     |
| 0020.4065.828c | 10.27.29.128   | modem | resident     |
| 0080.c6f9.b42e | 24.168.220.52  | host  |              |
| 0020.7806.defe | 192.168.28.134 | host  |              |
| 0020.4066.5c5c | 10.27.33.128   | modem | resident     |
| 0050.baa0.5ccd | 24.168.223.251 | host  |              |
| 0020.4070.56d8 | 10.27.29.129   | modem | resident     |
| 0050.046f.f4cf | 192.168.33.25  | host  |              |
| 0020.40b4.0c80 | 10.27.33.129   | modem | resident     |

```

0050.bacf.5d89 192.168.37.113 host
0020.4071.698e 10.27.29.130 modem resident
0050.1800.a8cb 192.168.33.90 host
0020.407a.c196 10.27.33.130 modem resident
0040.d00f.44f0 192.168.34.128 host
0020.407f.0c2c 10.27.33.131 modem resident
0050.e456.9641 192.168.39.66 host
0020.4071.65de 10.27.29.131 modem resident
0050.badd.2883 192.168.32.230 host
0020.4071.64b4 10.27.29.132 modem resident
0050.badd.3b12 192.168.33.246 host
00D0.ba41.41fc 10.27.33.132 modem resident
0020.78c7.f887 192.168.32.32 host
00D0.ba3d.871e 10.27.29.133 modem resident
00e0.2969.a1a5 192.168.36.246 host
00D0.ba40.fff3 10.27.29.135 modem resident
0020.78d5.ddf0 192.168.32.107 host
00001.02c5.9936 192.168.38.233 host
00D0.ba40.fe30 10.27.33.157 modem resident
0020.78d0.fb32 192.168.28.45 host
00D0.ba3b.e08d 10.27.33.158 modem resident
0050.1800.f458 192.168.36.209 host
0002.e301.df8f 192.168.30.191 host
00D0.ba3e.7b9c 10.27.29.158 modem resident
00a0.2451.b7eb 24.168.223.41 host
00D0.ba3c.3ff2 10.27.29.160 modem resident
0080.c7db.afba 192.168.33.153 host
00D0.2717.1899 192.168.39.189 host
00D0.ba33.a164 10.27.33.161 modem resident

```

Router#

Table 0-56 describes the fields that are shown in the **show cable device access-group** display:

**Table 0-56 Descriptions for the show cable device access-group Fields**

| Field        | Description                                                                                                                         |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address  | The MAC address for the CM or CPE device.                                                                                           |
| IP Address   | The IP address that the DHCP server has assigned to the CM or CPE device.                                                           |
| Type         | Identifies the type of device: <ul style="list-style-type: none"> <li>• host = CPE device</li> <li>• modem = cable modem</li> </ul> |
| Access-group | Displays the access group name or number in use (if any) for this CM or CPE device.                                                 |



**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                        | Description                                         |
|--------------------------------|-----------------------------------------------------|
| <b>cable device</b>            | Configures the access list for a CM device or host. |
| <b>cable host access-group</b> | Configures the access list for the specified hosts. |

## ■ show cable device access-group

| Command                              | Description                                                                       |
|--------------------------------------|-----------------------------------------------------------------------------------|
| <b>clear cable host</b>              | Clears the host from the table.                                                   |
| <b>show cable host access-group</b>  | Displays the hosts behind the CMs in the network, along with their access groups. |
| <b>show cable modem access-group</b> | Displays the access groups for the CMs on a particular cable interface.           |

# show cable dsg

To display the current DOCSIS Set-Top Gateway (DSG) tunneling parameters, use the **show cable dsg** command in privileged EXEC mode.

**show cable dsg** {stats | tunnel} [vendor *CA-vendor-name* | tunnel-mac-address]

| Syntax Description                  |  |                                                                                                                                                                                                                                  |
|-------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>stats</b>                        |  | Displays configuration and run-time statistics about the currently-defined DSG tunnels.                                                                                                                                          |
| <b>tunnel</b>                       |  | Displays the mapping of DSG tunnels to vendors or well-known MAC addresses.                                                                                                                                                      |
| <b>vendor</b> <i>CA-vendor-name</i> |  | (Optional) Displays information about a specific Conditional Access (CA) vendor. This parameter can be any arbitrary string up to 8 characters in length.                                                                        |
| <i>tunnel-MAC-address</i>           |  | (Optional) Displays information for the specified well-known MAC address for the DSG tunnel. If you specify a MAC address of 0000.0000.0000, the command displays information for all DSG tunnels, which is the default display. |

**Defaults** Displays information for all DSG tunnels.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                           |
|-----------------|-------------|----------------------------------------------------------------------------------------|
|                 | 12.2(15)BC2 | This command was introduced for the Cisco uBR7100 series and Cisco uBR7246VXR routers. |
|                 | 12.3(9a)BC  | This command was introduced on the Cisco uBR10012 router.                              |
|                 | 12.3(13a)BC | This command is obsolete and replaced by the <b>show cable dsg tunnel</b> command.     |

**Examples** The following example shows a typical display for the **show cable dsg tunnel** form of the command:

Router# **show cable dsg tunnel**

| Group-ip  | Src-ip | Tunnel-MAC     | Interface | Packets  | CA-vendor |
|-----------|--------|----------------|-----------|----------|-----------|
| 225.2.2.2 | *      | 0001.0002.0003 | Cable3/0  | 1589     | BBB       |
| 230.6.6.6 | *      | 000d.000d.000d | Cable3/0  | 12868464 | abc       |
| 230.7.7.7 | *      | 000e.000e.000e | Cable3/0  | 24330138 | abc       |
| 230.4.4.4 | *      | 000b.000b.000b | Cable3/0  | 22008648 | cisco     |
| 230.5.5.5 | *      | 000c.000c.000c | Cable3/0  | 6424012  | abc       |
| 229.1.1.1 | *      | 0009.0009.0009 | Cable3/0  | 12868440 | cisco     |
| 228.1.1.1 | *      | 0008.0008.0008 | Cable3/0  | 6424012  | cisco     |
| 230.1.1.1 | *      | 000a.000a.000a | Cable3/0  | 24370812 | cisco     |
| 230.8.8.8 | *      | 000f.000f.000f | Cable3/0  | 23035116 | abc       |

Router#

The following example shows a typical display for the **show cable dsg stats** command:

```
Router# show cable dsg stats

DSG statistics information

DSG keepalive is set

Vendor: DDD, Tunnel count: 1
Vendor: BBB, Tunnel count: 2

Vendor name is DDD, tunnel MAC is 0001.0002.0003
Group address is 226.2.2.2, source address is *
 Interface is Cable5/1, mapping entry is used 1
 Received 5968 packets, forwarded 5289 packets
 Dropped 679 packets, last second rate 16878 bits/sec

Vendor name is BBB, tunnel MAC is 0009.0010.0011
Group address is 227.2.2.2, source address is *
 Interface is Cable3/0, interface Cable3/0 is bundle master
 mapping entry is used 2
 Received 0 packets, forwarded 0 packets
 Dropped 0 packets, last second rate 0 bits/sec

Vendor name is CCC, tunnel MAC is 0005.0006.0007
Group address is 228.3.3.3, source address is *
 Interface is Cable5/1, mapping entry is used 2
 Received 5970056 packets, forwarded 400333 packets
 Dropped 5569723 packets, last second rate 96768 bits/sec

Router#
```

The following example shows a typical display for the **show cable dsg stats** command for an individual vendor:

```
Router# show cable dsg stats vendor CCC

DSG statistics information

DSG keepalive is set

Vendor: CCC, Tunnel count: 1

Vendor name is CCC, tunnel MAC is 0005.0006.0007
Group address is 228.3.3.3, source address is *
 Interface is Cable5/1, mapping entry is used 2
 Received 5970056 packets, forwarded 400333 packets
 Dropped 5569723 packets, last second rate 96768 bits/sec

Router#
```



#### Note

The packet counters for both the **stats** and **tunnel** options for a particular DSG tunnel continue to increase as long as traffic is received over that tunnel. If the tunnel does not receive any traffic for three minutes or more, the counters are automatically reset to 0.

The following example shows a typical display for the **show cable dsg stats** command for an individual vendor when the associated cable interface is shut down. The Received, Forwarded, and Dropped counters are not displayed when an interface is shut down.

```
Router(config)# interface c5/1
Router(config-if)# shutdown
```

```

Router(config-if)# exit
Router(config)# exit
Router# show cable dsg stats vendor CCC

DSG statistics information

DSG keepalive is set

Vendor: CCC, Tunnel count: 1

Vendor name is CCC, tunnel MAC is 0005.0006.0007
Group address is 228.3.3.3, source address is *
Interface is Cable5/1, mapping entry is used 2

Router#

```

Table 57 describes the major fields shown in the **show cable dsg** command:

**Table 57** *show cable dsg Field Descriptions*

| Field                  | Description                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DSG keepalive is set   | If keepalive messages have been enabled for an IP multicast group, using the <b>cable dsg keepalive</b> command, this message is displayed.                                                                                                                                                                                                                                                       |
| Dest-ip, Group address | Multicast group IP address for the DSG stream.                                                                                                                                                                                                                                                                                                                                                    |
| Src-ip, Source address | Source IP address for the DSG stream. If an asterisk (*) appears as the source IP address, it indicates that the source IP address is 0.0.0.0, which allows any IP address as the source IP address.                                                                                                                                                                                              |
| Mapped-MAC, Tunnel-MAC | Well-known MAC address used for the DSG tunnel. If you configured the DSG tunnel with a MAC address of 0000.0000.0000 using the <b>cable dsg</b> command, this field shows the MAC address that the CMTS derived using the MAC to IP multicast addressing mapping that is specified in RFC 1112.                                                                                                  |
| Interface              | Cable interface on which this DSG tunnel is configured.                                                                                                                                                                                                                                                                                                                                           |
| mapping entry is used  | Number of times that this particular DSG tunnel mapping has been used to resolve the well-known MAC address from the tunnel's group address. This can be used as a very rough approximation of the number set-top boxes (STBs) that have been mapped to this DSG tunnel since the last time the counter was cleared.<br><b>Note</b> Use the <b>clear cable dsg</b> command to clear this counter. |
| Packets                | Number of packets transmitted over the DSG tunnel.                                                                                                                                                                                                                                                                                                                                                |
| CA-vendor              | Name for the Conditional Access (CA) vendor that owns this tunnel.                                                                                                                                                                                                                                                                                                                                |
| Received               | Number of packets received by the multicast group. This counter includes all interfaces that are receiving traffic for the multicast group. The field is not shown when an interface is shut down, but the counter continues to increase as long as the multicast group is receiving traffic. When the interface is reenabled, the counter shows the latest number of packets received.           |

**Table 57** *show cable dsg Field Descriptions (continued)*

| Field     | Description                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Forwarded | Number of packets forwarded on the cable interface for the multicast group. This counter is reset to 0 whenever an interface is shut down and reenabled. The field is not shown when an interface is shut down.                                                                                                                                                                                                                 |
| Dropped   | Number of packets that were dropped that were for the multicast group. This counter includes all interfaces that are receiving traffic for the multicast group. The field is not shown when an interface is shut down, but the counter continues to increase as long as the multicast group is receiving traffic and dropping packets. When the interface is reenabled, the counter shows the latest number of packets dropped. |

**Note**

The Received and Dropped counters reflect activity for the multicast group and are not affected when a cable interface is shut down and reenabled, as long as the multicast group continues to receive traffic. The Forwarded counter reflects activity for the particular cable interface and is reset to zero whenever the interface is shut down and reenabled. All packet counters are also automatically reset to zero if the DSG tunnel does not receive traffic for three minutes or more.

**Related Commands**

| Command                    | Description                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>cable dsg</b>           | Enables the DOCSIS Set-Top Gateway (DSG) on a cable interface, and configures its tunnel-mapping parameters. |
| <b>cable dsg keepalive</b> | Enables keepalive messages over DOCSIS Set-Top Gateway (DSG) tunnels on a cable interface.                   |
| <b>clear cable dsg</b>     | Resets counters related to DOCSIS Set-Top Gateway (DSG) tunnels.                                             |
| <b>debug cable dsg</b>     | Enables the display of debugging messages for the operation of the DOCSIS Set-Top Gateway (DSG) feature.     |



# show cable dsg cfr

To display DOCSIS Set-Top Gateway (DSG) classifier details, such as the classifier state, source, and destination IP addresses, use the **show cable dsg cfr** command in privileged EXEC mode.

**show cable dsg cfr** [*index*] [*verbose*]

|                    |                |                                                                    |
|--------------------|----------------|--------------------------------------------------------------------|
| Syntax Description | <i>index</i>   | DSG classifier identification. The valid range is from 1 to 65535. |
|                    | <i>verbose</i> | Provides detailed output for DSG classifiers.                      |

|                 |                                          |
|-----------------|------------------------------------------|
| Command Default | Displays details of all DSG classifiers. |
|-----------------|------------------------------------------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCG | This command was introduced. |

**Examples** The following is a sample output of the **show cable dsg cfr** command that shows details of all DSG classifiers:

Router# **show cable dsg cfr**

| cfr id | state | resolved | applied | conflict | dest-ip      | src-ip                      |
|--------|-------|----------|---------|----------|--------------|-----------------------------|
| 1000   | en    | yes      | yes     | no       | 232.10.10.0  | dsg-server-a<br>(40.0.0.30) |
| 1010   | en    | yes      | yes     | no       | 232.10.10.10 | dsg-server-b<br>(40.0.0.40) |
| 2000   | en    | yes      | yes     | no       | 232.10.11.0  | dsg-server-c<br>(40.0.0.50) |
| 2010   | en    | no       | no      | no       | 232.10.11.10 | non-exist-hostnam<br>(----  |

The following is a sample output of the **show cable dsg cfr** command that shows details of a specified DSG classifier:

Router# **show cable dsg cfr 1010**

| cfr id | state | resolved | applied | conflict | dest-ip      | src-ip                      |
|--------|-------|----------|---------|----------|--------------|-----------------------------|
| 1010   | en    | yes      | yes     | no       | 232.10.10.10 | dsg-server-b<br>(40.0.0.40) |

The following is a sample output of the **show cable dsg cfr** command with the **verbose** keyword that shows detailed output for all DSG classifiers:

Router# **show cable dsg cfr verbose**

```

Cfr Id : 1000
State : enable
Resolved : yes
Applied : yes
Conflict : no
Conflict Cfr Id : --
Error Code : 0 (DSG_CFR_ERR_NONE)
Tunnel Id : 1000
Dest Hostname : ----
Dest Hostname IP : ----
Dest IP : 232.10.10.0
Src Hostname : dsg-server-a
Src Hostname IP : 40.0.0.30
Src IP : 40.0.0.30
Src Prefix Length : 32
Dest Port Start : 2000
Dest Port End : 13821
Priority : 1
In DCD : yes
Forwarded : 0
Received : 0

Cfr Id : 1010
State : enable
Resolved : yes
Applied : yes
Conflict : no
Conflict Cfr Id : --
Error Code : 0 (DSG_CFR_ERR_NONE)
Tunnel Id : 1010
Dest Hostname : ----
Dest Hostname IP : ----
Dest IP : 232.10.10.10
Src Hostname : dsg-server-b
Src Hostname IP : 40.0.0.40
Src IP : 40.0.0.40
Src Prefix Length : 32
Dest Port Start : 2000
Dest Port End : 13821
Priority : 1
In DCD : yes
Forwarded : 0
Received : 0

Cfr Id : 2000
State : enable
Resolved : yes
Applied : yes
Conflict : no
Conflict Cfr Id : --
Error Code : 0 (DSG_CFR_ERR_NONE)
Tunnel Id : 2000
Dest Hostname : ----
Dest Hostname IP : ----
Dest IP : 232.10.11.0
Src Hostname : dsg-server-c
Src Hostname IP : 40.0.0.50
Src IP : 40.0.0.50

```

```

Src Prefix Length : 32
Dest Port Start : 13822
Dest Port End : 13822
Priority : 1
In DCD : yes
Forwarded : 0
Received : 0

Cfr Id : 2010
State : enable
Resolved : no
Applied : no
Conflict : no
Conflict Cfr Id : --
Error Code : 0 (DSG_CFR_ERR_NONE)
Tunnel Id : 2010
Dest Hostname : ----
Dest Hostname IP : ----
Dest IP : 232.10.11.10
Src Hostname : non-exist-hostname
Src Hostname IP : ----
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 2000
Dest Port End : 13821
Priority : 1
In DCD : yes
Forwarded : 0
Received : 0

Cfr Id : 3000
State : enable
Resolved : yes
Applied : yes
Conflict : no
Conflict Cfr Id : --
Error Code : 0 (DSG_CFR_ERR_NONE)
Tunnel Id : 3000
Dest Hostname : ----
Dest Hostname IP : ----
Dest IP : 239.10.11.11
Src Hostname : ----
Src Hostname IP : ----
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 2000
Dest Port End : 13821
Priority : 1
In DCD : yes
Forwarded : 0
Received : 0

```

The following is a sample output of the **show cable dsf cfr** command with the **verbose** keyword that shows detailed output for a single DSG classifier:

```
Router# show cable dsf cfr 1010 verbose
```

```

Cfr Id : 1010
State : enable
Resolved : yes
Applied : yes
Conflict : no
Conflict Cfr Id : --
Error Code : 0 (DSG_CFR_ERR_NONE)

```

## ■ show cable dsg cfr

```

Tunnel Id : 1010
Dest Hostname : ----
Dest Hostname IP : ----
Dest IP : 232.10.10.10
Src Hostname : dsg-server-b
Src Hostname IP : 40.0.0.40
Src IP : 40.0.0.40
Src Prefix Length : 32
Dest Port Start : 2000
Dest Port End : 13821
Priority : 1
In DCD : yes
Forwarded : 0
Received : 0

```

Table 58 describes the significant fields shown in the **show cable dsg cfr** command display:

**Table 58** *show cable dsg cfr Field Description*

| Field             | Description                                                                                                                                                                                                             |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cfr id            | DSG classifier ID.                                                                                                                                                                                                      |
| state             | DSG classifier state shown either as “enable” or “disable.”                                                                                                                                                             |
| resolved          | Indicates whether the destination and source IP addresses of a hostname are resolved or not.                                                                                                                            |
| applied           | Indicates that a hostname is configured without any error.                                                                                                                                                              |
| conflict          | Indicates that the IP address of the hostname is changed after the hostname is configured, and the DSG classifier cannot be updated due to an error.                                                                    |
| dest-ip           | IP address configured as the destination IP address or the resolved hostname IP address. This IP address might differ from the destination hostname IP address if the classifier is not applied or in a conflict state. |
| src-ip            | IP address configured as the source IP address or the resolved hostname IP address. This IP address might differ from the source hostname IP address if the classifier is not applied or in a conflict state.           |
| Conflict Cfr Id   | Indicates the classifier ID that conflicts with the new classifier due to an identical MAC address or classifier ID.                                                                                                    |
| Error Code        | Indicates why the classifier is resolved but cannot be applied.                                                                                                                                                         |
| Tunnel Id         | DSG tunnel ID.                                                                                                                                                                                                          |
| Dest Hostname     | The hostname configured as the destination IP address.                                                                                                                                                                  |
| Dest Hostname IP  | Resolved IP address of the destination hostname.                                                                                                                                                                        |
| Src Hostname      | The hostname configured as the source IP address.                                                                                                                                                                       |
| Src Hostname IP   | Resolved IP address of the source hostname.                                                                                                                                                                             |
| Src Prefix Length | Source prefix length of the source IP address.                                                                                                                                                                          |
| Dest Port Start   | Start range for the Destination TCP/UDP port.                                                                                                                                                                           |
| Dest Port End     | End range for the Destination TCP/UDP port.                                                                                                                                                                             |
| Priority          | DSG classifier priority.                                                                                                                                                                                                |
| In DCD            | Indicates whether the DSG classifier is included or excluded from the downstream channel descriptor (DCD) message.                                                                                                      |

**Table 58** *show cable dsg cfr Field Description (continued)*

| Field     | Description           |
|-----------|-----------------------|
| Forwarded | Forwarded statistics. |
| Received  | Received statistics.  |

**Related CommandsR**

| Command                    | Description                                                                           |
|----------------------------|---------------------------------------------------------------------------------------|
| <b>show cable dsg host</b> | Displays the mapping of the DSG host names and IP addresses on the Cisco CMTS router. |

# show cable dsg host

To display the mapping of the hostnames and IP addresses on a Cisco CMTS router, use the **show cable dsg host** command in privileged EXEC mode.

**show cable dsg host [verbose]**

| Syntax Description | verbose | Provides verbose description on the mapping of the hostnames and IP addresses. |
|--------------------|---------|--------------------------------------------------------------------------------|
|--------------------|---------|--------------------------------------------------------------------------------|

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

| Usage Guidelines | The <b>show cable dsg host</b> command is used for debugging of host IP addresses. |
|------------------|------------------------------------------------------------------------------------|
|------------------|------------------------------------------------------------------------------------|

| Examples | The following is a sample output of the <b>show cable dsg host</b> command that shows the mapping of the host names and IP addresses on a Cisco CMTS router: |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|

Router# **show cable dsg host**

| Host       | IP Address | Reference | Last Update Time |
|------------|------------|-----------|------------------|
| dsgserver1 | 232.1.1.10 | 2         | 21:41 08/01/2011 |
| dsgserver2 | 234.3.2.1  | 1         | 21:41 08/01/2011 |
| dsgserver3 | ----       | 1         | never            |
| dsgserver4 | ----       | 1         | never            |
| dsgserver5 | ----       | 1         | never            |
| dsgserver6 | 235.5.5.5  | 1         | 21:41 08/01/2011 |
| dsgserver7 | 235.0.0.2  | 1         | 21:41 08/01/2011 |

The following is a sample output of the **show cable dsg host** command with the **verbose** keyword on a Cisco CMTS router:

```
Router# show cable dsg host verbose

Host IP Address Reference Last Update Time

dsgserver1 232.1.1.10 2 21:41 08/01/2011
 Cfrs:
 cable dsg cfr 2 dest-ip 232.1.1.125 tunnel 1 priority 0 src-ip a.b.c.d d...
 cable dsg cfr 3 dest-ip 232.1.1.125 tunnel 1 priority 10 src-ip a.b.c.d ...

dsgserver2 234.3.2.1 1 21:41 08/01/2011
 Cfrs:
 cable dsg cfr 4 dest-ip aaabbccc priority 0 src-ip cccdddeee disable

dsgserver3 ---- 1 never
 Cfrs:
 cable dsg cfr 4 dest-ip aaabbccc priority 0 src-ip cccdddeee disable

dsgserver4 235.0.0.2 1 21:41 08/01/2011
 Cfrs:
 cable dsg cfr 24 dest-ip g2 priority 0 disable

dsgserver5 235.0.0.3 1 21:41 08/01/2011
 Cfrs:
 cable dsg cfr 30 dest-ip g3 tunnel 1 priority 0 disable
```

[Table 58](#) describes the significant fields shown in the **show cable dsg host** command display:

**Table 59** *show cable dsg host Field Description*

| Field            | Description                                                                |
|------------------|----------------------------------------------------------------------------|
| Host             | Hostname of the DSG classifier.                                            |
| IP Address       | IP address that is mapped to the hostname.                                 |
| Reference        | DSG classifiers that use the host as a fully-qualified domain name (FQDN). |
| Last Update Time | Last updated time of the DSG server.                                       |

#### Related Commands

| Command                   | Description                      |
|---------------------------|----------------------------------|
| <b>show cable dsg cfr</b> | Displays DSG classifier details. |

# show cable dsg static-group bundle

To display details of the DOCSIS Set-Top Gateway (DSG) static groups configured under a bundle interface, use the **show cable dsg static-group bundle** command in privileged EXEC mode.

**show cable dsg static-group bundle** *index*

|                           |              |                                                            |
|---------------------------|--------------|------------------------------------------------------------|
| <b>Syntax Description</b> | <i>index</i> | Bundle interface number. The valid range is from 1 to 255. |
|---------------------------|--------------|------------------------------------------------------------|

|                        |      |  |
|------------------------|------|--|
| <b>Command Default</b> | None |  |
|------------------------|------|--|

|                      |                     |  |
|----------------------|---------------------|--|
| <b>Command Modes</b> | Privileged EXEC (#) |  |
|----------------------|---------------------|--|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCG    | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The IGMP static group IP address created automatically under a bundle interface at the time of DSG configuration is not displayed in the <b>show running-config interface</b> command output in Cisco IOS Release 12.2(33)SCG and later. To display the DSG static groups configured under a bundle interface, use the <b>show cable dsg static-group bundle</b> command in privileged EXEC mode in Cisco IOS Release 12.2(33)SCG and later. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following is a sample output of the <b>show cable dsg static-group bundle</b> command that lists the DSG static groups configured under a bundle interface on the Cisco uBR10012 router: |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show cable dsg static-group bundle 2
```

|                  |           |         |
|------------------|-----------|---------|
| Bundle Interface | Group     | Source  |
| Bundle2          | 228.0.0.1 | 0.0.0.0 |
| Bundle2          | 228.0.0.1 | 1.2.3.4 |
| Bundle2          | 232.1.1.1 | 2.3.4.5 |

[Table 60](#) describes the significant fields shown in the **show cable dsg static-group bundle** command display:

**Table 60** *show cable dsg static-group bundle Command Field Description*

| Field            | Description                                                       |
|------------------|-------------------------------------------------------------------|
| Bundle Interface | Bundle interface number.                                          |
| Group            | DSG static group configured under the specified bundle interface. |
| Source           | SSM source address.                                               |



| Related Commands | Command              | Description                                                                                |
|------------------|----------------------|--------------------------------------------------------------------------------------------|
|                  | <b>cable dsg cfr</b> | Enables Advanced-mode DOCSIS Set-Top Gateway (A-DSG) classifiers on the Cisco CMTS router. |

# show cable dsf tg

To display information about the Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnel group configuration on a Cisco CMTS router, use the **show cable dsf tg** command in privileged EXEC mode.

**show cable dsf tg** [*tunnel-group-id* {**channel** *channel-id*} [**verbose**]]

## Syntax Description

|                                  |                                                                  |
|----------------------------------|------------------------------------------------------------------|
| <i>tunnel-group-id</i>           | (Optional) Alphanumeric identifier for a specified tunnel group. |
| <b>channel</b> <i>channel-id</i> | Specifies the DSG tunnel group channel identifier.               |
| <b>verbose</b>                   | (Optional) Displays DSG tunnel group detail information.         |

## Command Default

None

## Command Modes

Privileged EXEC (#)

## Command History

| Release      | Modification                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC  | This command was introduced to support A-DSG on the Cisco uBR10012 router and Cisco uBR7200 series routers.        |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCD5 | This command was modified. The output of the <b>show cable dsf tg</b> command was changed.                         |
| 12.2(33)SCG  | The command output was changed.                                                                                    |

## Usage Guidelines

This command displays information about all DSG tunnel groups. Beginning with Cisco IOS Release 12.2(33)SCG, the “TG state” field in the **show cable dsf tg** command output was replaced by “Channel state” to indicate that a channel belonging to a tunnel group is either enabled or disabled. It is possible that a tunnel group is enabled but a particular channel in that tunnel group is disabled.

## Examples

The following is a sample output from the **show cable dsf tg** command with the configured parameters for all DSG tunnel groups in Cisco IOS Release 12.2(33)SCG and later:

Router# **show cable dsf tg**

| TG id | Chan id | Chan state | I/F  | Rule pri | Vendor Param | UCID list |
|-------|---------|------------|------|----------|--------------|-----------|
| 10    | 1       | en         | C6/0 | 0        |              |           |
| 10    | 2       | en         | C6/0 | 0        |              |           |
| 10    | 3       | en         | C6/1 | 0        |              |           |
| 10    | 4       | en         |      | 0        |              |           |
| 10    | 5       | en         |      | 0        |              |           |
| 10    | 6       | en         |      | 0        |              |           |

The following is a sample output from the **show cable dsd tg** command with the configured parameters for all DSG tunnel groups in Cisco IOS Release 12.2(33)SCE and earlier:

```
Router# show cable dsd tg
```

| TG id | Chan id | TG state | I/F  | Rule pri | Vendor Param | UCID list |
|-------|---------|----------|------|----------|--------------|-----------|
| 1     | 1       | en       | C5/0 | 16       | 1            | 1 2 3 4   |
| 1     | 2       | en       |      | 0        |              |           |
| 2     | 1       | en       | C5/0 | 11       | 2            |           |
|       |         |          | C5/1 |          |              |           |
| 2     | 2       | en       |      | 0        |              |           |

The following is a sample output from the **show cable dsd tg 1 channel 1** command with the configured parameters for all DSG tunnel groups for the specified tunnel group and channel.

```
Router# show cable dsd tg 1 channel 1
```

| TG id | Chan id | Chan state | I/F  | Rule pri | Vendor Param | UCID list |
|-------|---------|------------|------|----------|--------------|-----------|
| 1     | 1       | en         | C5/0 | 16       | 1            | 1 2 3 4   |

The following is a sample output from the **show cable dsd tg 1 channel 1 verbose** command with the detailed information for the specified tunnel group.

```
Router# show cable dsd tg 1 channel 1 verbose
```

| TG: 1  | Chan: 1 | state: en | pri: 16           | Vendor: 1 | UCID: 1 2 3 4 |       |
|--------|---------|-----------|-------------------|-----------|---------------|-------|
| I/F    | rule    | tunnel    | cfr               | clients   |               |       |
| C7/0/0 | 1       | en 1      | en 0101.5e01.0001 | 1         | en 230.1.0.1  | yes 1 |
|        |         |           |                   | 6         | en 231.1.1.6  | no    |
|        |         |           |                   | 7         | en 231.1.1.7  | no    |
|        |         |           |                   | 8         | en 231.1.1.8  | no    |
|        | 2       | en 2      | en 0101.5e01.0002 | 2         | en 230.1.0.2  | yes 2 |
|        | 3       | en 3      | en 0101.5e01.0003 | 3         | en 230.1.0.3  | yes 3 |

The following is sample output of the **show cable dsd tg** command that displays the **ignore** option, introduced in Cisco IOS Release 12.2(33)SCD5, under the 'In DCD' column.

```
Router# show cable dsd tg 1 channel 1 verbose
```

| TG: 1  | Chan: 1 | state: en | pri: 16           | Vendor: 1 | UCID: 1 2 3 4 |       |
|--------|---------|-----------|-------------------|-----------|---------------|-------|
| I/F    | rule    | tunnel    | cfr               | clients   |               |       |
| C7/0/0 | 1       | en 1      | en 0101.5e01.0001 | 1         | en 230.1.0.1  | ign 1 |
|        |         |           |                   | 6         | en 231.1.1.6  | no    |
|        |         |           |                   | 7         | en 231.1.1.7  | no    |
|        |         |           |                   | 8         | en 231.1.1.8  | no    |
|        | 2       | en 2      | en 0101.5e01.0002 | 2         | en 230.1.0.2  | yes 2 |
|        | 3       | en 3      | en 0101.5e01.0003 | 3         | en 230.1.0.3  | yes 3 |

Table 1 describes the significant fields shown in the output.

**Table 61** *show cable dsd tg Field Descriptions*

| Field    | Description                           |
|----------|---------------------------------------|
| TG id    | Tunnel group identifier.              |
| Chan id  | Channel identifier.                   |
| TG state | Current state of the cable interface. |

**Table 61** *show cable dsg tg Field Descriptions (continued)*

| Field          | Description                                         |
|----------------|-----------------------------------------------------|
| Chan state     | Current state of the channel (enabled or disabled). |
| pri            | Traffic priority parameter.                         |
| Vendor         | Vendor name.                                        |
| UCID           | Upstream channel identifier.                        |
| I/F            | Interface.                                          |
| rule id        | Rule identifier.                                    |
| tunnel state   | Tunnel state.                                       |
| mac-addr       | MAC address.                                        |
| cfr state      | Classifier state.                                   |
| dest-ip        | Destination IP address.                             |
| In-DCD         | Downstream channel descriptor.                      |
| clients listId | Client list identifier.                             |

**Related Commands**

| Command                                    | Description                                                                    |
|--------------------------------------------|--------------------------------------------------------------------------------|
| <b>debug cable dsg</b>                     | Enables general, DCD, or packet-related debugging.                             |
| <b>show cable dsg tunnel</b>               | Displays information about A-DSG tunnel configuration on a Cisco CMTS router.  |
| <b>show interface</b>                      | Displays general interface information for the specified or all interfaces.    |
| <b>show interface cable dsg downstream</b> | Displays A-DSG configuration and status information for downstream interfaces. |

# show cable dsg tunnel

To display information about Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnel configuration on a Cisco CMTS router, use the **show cable dsg tunnel** command in privileged EXEC mode.

**show cable dsg tunnel** *tunnel-id* [**cfrs** | **clients** | **interfaces** | **statistics** | **verbose**]

| Syntax Description |                                                            |
|--------------------|------------------------------------------------------------|
| <i>tunnel-id</i>   | (Optional) Alphanumeric identifier for a specified tunnel. |
| <b>cfrs</b>        | Show DSG tunnel classifiers.                               |
| <b>clients</b>     | Show DSG tunnel clients.                                   |
| <b>interfaces</b>  | Show DSG tunnel interfaces.                                |
| <b>stats</b>       | Show DSG tunnel statistics.                                |
| <b>verbose</b>     | Show DSG tunnel detail information.                        |

**Defaults** No default behaviors or values

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was introduced to support A-DSG 1.1 on the Cisco uBR10012 router and Cisco uBR7200 series routers.                                                                                                                                                                                                                                                                                                                                   |
|                 | 12.3(17a)BC | The output was modified to support A-DSG 1.2. <ul style="list-style-type: none"> <li>The “TG id” field was added to the <b>show cable dsg tunnel</b> and <b>verbose</b> forms of the command.</li> <li>The “State” and “MAC Addr” fields switched places in the <b>show cable dsg tunnel verbose</b> form of the command.</li> <li>The “vendor group” field was added to the <b>show cable dsg tunnel clients</b> form of the command.</li> </ul> |
|                 | 12.2SB      | This command was integrated into Cisco IOS Release 12.2SB. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                                                                                                                                                     |

**Usage Guidelines** This command replaces the **show cable dsg** form of command available in Cisco IOS Release 12.3(9a)BC.

**Examples** The following example displays CLI help for **show cable dsg tunnel** command syntax.

```
Router# show cable dsg tunnel 1 ?
cfrs Show DSG tunnel classifiers
clients Show DSG tunnel clients
interfaces Show DSG tunnel interfaces
statistics Show DSG tunnel statistics
```

## ■ show cable dsg tunnel

```

verbose Show DSG tunnel detail information
| Output modifiers
<cr>

```

**Examples: Displaying information about all A-DSG Tunnels**

The following command displays tunnel MAC address, state, associated classifiers, and state information for Advanced-mode DSG version 1.1 tunnels on a Cisco CMTS router. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2 (see following example).

```
Router# show cable dsg tunnel
```

| tunnel id | tunnel state | tunnel mac-addr | cfr id | cfr state | tunnel in interface | rule id | rule state | client listId | service class |
|-----------|--------------|-----------------|--------|-----------|---------------------|---------|------------|---------------|---------------|
| 1         | en           | 0100.5e01.0114  | 1      | en        | Cable6/0            | 1       | en         | 2             | SI            |
|           |              |                 | 5      | en        |                     | 7       | en         | 10            |               |
|           |              |                 | 11     | en        |                     | 8       | en         | 2             |               |
|           |              |                 | 14     | en        |                     | 20      | en         | 2             |               |
|           |              |                 |        |           | Cable6/1            | 1       | en         | 4             |               |
|           |              |                 |        |           |                     | 3       | en         | 3             |               |
|           |              |                 |        |           |                     | 4       | en         | 4             |               |
|           |              |                 |        |           |                     | 11      | en         | 2             |               |
| 2         | en           | 0100.5e01.011e  | 2      | en        | Cable6/0            | 2       | en         | 2             | NDS-CA        |
|           |              |                 | 10     | en        |                     |         |            |               |               |
| 3         | en           | 0100.5e01.0128  | 3      | en        | Cable6/0            | 3       | en         | 3             | NDS-APP       |
| 4         | en           | 0100.5e01.0132  | 4      | en        | Cable6/0            | 4       | en         | 4             | MOTO-CA       |
| 5         | en           | 0100.5e01.013c  | 9      | en        | Cable6/0            | 5       | en         | 5             | MOTO-APP      |
|           |              |                 |        |           | Cable6/1            | 5       | en         | 5             |               |
| 6         | dis          | 0100.5e01.0146  |        |           | Cable6/0            | 6       | en         | 6             | SA-CA         |
|           |              |                 |        |           | Cable6/1            | 6       | en         | 6             |               |
| 7         | dis          | 0100.5e01.0150  | 7      | en        | Cable6/1            | 8       | en         | 7             | SA-APP        |
|           |              |                 | 13     | dis       |                     |         |            |               |               |
| 8         | en           | 0100.5e01.0119  | 8      | en        |                     |         |            |               | NDS-DNLD      |
| 9         | en           | 0100.5e01.0133  |        |           |                     |         |            |               | MOTO-DNLD     |
| 10        | en           | 0100.5e01.0147  |        |           |                     |         |            |               | SA-DNLD       |
| 11        | en           | 2222.2222.2222  |        |           |                     |         |            |               |               |
| 12        | en           | 3333.3333.3333  | 12     | en        |                     |         |            |               |               |

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the tunnel group ID (“TG id”) field in support of A-DSG version 1.2 as shown below:

```
Router# show cable dsg tunnel
```

| tunnel id | tunnel state | tunnel mac-addr | TG id | cfr id | cfr state | tunnel I/F | rule id | rule state | client listId | service class |
|-----------|--------------|-----------------|-------|--------|-----------|------------|---------|------------|---------------|---------------|
| 1         | en           | 0100.5e01.0001  | 1     | 1      | en        | C5/0       | 1       | en         | 1             | DSG-Rate1     |
|           |              |                 |       | 6      | en        |            |         |            |               |               |
|           |              |                 |       | 7      | en        |            |         |            |               |               |
|           |              |                 |       | 8      | en        |            |         |            |               |               |
| 2         | en           | 0100.5e01.0002  | 1     | 2      | en        | C5/0       | 2       | en         | 2             |               |
| 3         | en           | 0100.5e01.0003  | 1     | 3      | en        | C5/0       | 3       | en         | 3             |               |
| 4         | en           | 0002.0002.0001  | 2     | 4      | en        | C5/0       | 4       | en         | 1             |               |
|           |              |                 |       |        |           | C5/1       | 1       | en         | 1             |               |
| 5         | en           | 0002.0002.0002  | 2     | 5      | en        | C5/0       | 5       | en         | 2             | DSG-Rate2     |
|           |              |                 |       |        |           | C5/1       | 2       | en         | 2             |               |
| 6         | en           | 0002.0002.0003  | 2     | 9      | en        | C5/0       | 6       | en         | 21            |               |
|           |              |                 |       |        |           | C5/1       | 3       | en         | 21            |               |

**Examples: Displaying Information for a Specified A-DSG Tunnel**

The following example displays the same information as the **show cable dsg tunnel** command, but for a specified tunnel. The following example shows sample output for A-DSG version 1.1. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2 (see following example).

```
Router# show cable dsg tunnel 1
```

| tunnel id | tunnel state | tunnel mac-addr | cfr id | cfr state | tunnel in interface | rule id | rule state | client listId | service class |
|-----------|--------------|-----------------|--------|-----------|---------------------|---------|------------|---------------|---------------|
| 1         | en           | 0100.5e01.0114  | 1      | en        | Cable6/0            | 1       | en         | 2             | SI            |
|           |              |                 | 5      | en        |                     | 7       | en         | 10            |               |
|           |              |                 | 11     | en        |                     | 8       | en         | 2             |               |

```

14 en
 Cable6/1
 1 en 2
 3 en 4
 4 en 3
 4 en 4
 11 en 2

```

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the tunnel group ID (“TG id”) field in support of A-DSG version 1.2 as shown below:

```

Router# show cable dsg tunnel 1
 tunnel TG cfr tunnel rule client service
id state mac-addr id id state I/F id state listId class
1 en 0100.5e01.0001 1 1 en C5/0 1 en 1 DSG-Rate1
 6 en
 7 en
 8 en

```

### Examples: Displaying Information for A-DSG Tunnel Classifiers

The following example displays detailed information about all A-DSG classifiers associated with the specified tunnel.

```

Router# show cable dsg tunnel 1 cfrs

tunnel cfr cfr cfr destination ip source ip srcPre d_port d_port
id id state pri address address length start end
1 1 en 1 230.1.1.20 0.0.0.0 32 0 65535
 5 en 1 230.1.1.60 0.0.0.0 32 0 65535
 11 en 1 224.25.25.134 0.0.0.0 32 0 65535
 14 en 0 230.1.1.20 0.0.0.0 32 1000 2000

```

### Examples: Displaying Information for A-DSG Tunnel Clients

The following example displays detailed information about all the clients associated with the specified tunnel for A-DSG version 1.1. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2 (see following example).

```

Router# show cable dsg tunnel 1 clients

tunnel client client client client
id listId id id type address
1 2 1 CA System ID 0X951
 3 3 Broadcast
 8 8 MAC Addr 1111.1111.1111
 3 1 Application ID 0X1
 4 1 CA System ID 0X701
 10 1 Application ID 0X6

```

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the “vendor group” field in support of A-DSG version 1.2 as shown below:

```

Router# show cable dsg tunnel 1 clients

tunnel client client client client vendor
id listId id id type address group
1 1 1 MAC Addr 0100.5e00.0001
 2 2 Application ID 0x0951
 3 3 Broadcast Unspecified
 4 4 Broadcast 4

```

### Examples: Displaying Information for A-DSG Tunnel Interfaces

The following example displays all the interfaces and rules associated with a specified tunnel.

```

Router# show cable dsg tunnel 1 interfaces

tunnel downstream rule
id interface id
1 Cable6/0 1 7 8 20

```

```
Cable6/1 1 3 4 11
```

### Examples: Displaying Information for A-DSG Tunnel Statistics

The following example displays the packets statistics information about the specified tunnel.

```
Router# sh cab dsg tunnel 1 statistics
tunnel cfr cfr destination ip source ip total total
id id state address address forwarded received
1 1 en 230.1.1.20 0.0.0.0 0 0
 5 en 230.1.1.60 0.0.0.0 0 0
 11 en 224.25.25.134 0.0.0.0 0 0
 14 en 230.1.1.20 0.0.0.0 0 0
```

### Examples: Displaying Detailed Information for a Specified A-DSG Tunnel

The following example shows all the detailed information about a specified tunnel for A-DSG version 1.1. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2 (see following example).

```
Router# show cable dsg tunnel 1 verbose

Tunnel ID : 1
MAC Addr : 0100.5e01.0114
State : enable

Cfr Id : 1
State : enable
Priority : 1
Dest IP : 230.1.1.20
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 5
State : enable
Priority : 1
Dest IP : 230.1.1.60
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 11
State : enable
Priority : 1
Dest IP : 224.25.25.134
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 14
State : enable
Priority : 0
Dest IP : 230.1.1.20
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 1000
Dest Port End : 2000
Forwarded : 0
Received : 0

Client List Id : 2
Client Id : 1
```



```

Client Id Type : CA System ID: 0951
Client Id : 3
Client Id Type : Broadcast
Client Id : 8
Client Id Type : MAC Addr: 1111.1111.1111

Client List Id : 3
Client Id : 1
Client Id Type : Application ID: 0001

Client List Id : 4
Client Id : 1
Client Id Type : CA System ID: 0701

Client List Id : 10
Client Id : 1
Client Id Type : Application ID: 0006

Interface : Cable6/0
Rule Id : 1
Rule Id : 7
Rule Id : 8
Rule Id : 20
Interface : Cable6/1
Rule Id : 1
Rule Id : 3
Rule Id : 4
Rule Id : 11

```

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the “TG id” field in support of A-DSG version 1.2. The “State” and “MAC Addr” fields also switched positions in the output.

```

Router# show cable dsg tunnel 1 verbose
Tunnel ID : 1
State : enable
MAC Addr : 0100.5e01.0001

TG Id : 1

Cfr Id : 1
State : enable
Priority : 0
Dest IP : 230.1.0.1
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 6
State : enable
Priority : 0
Dest IP : 231.1.1.6
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 7
State : enable
Priority : 0
Dest IP : 231.1.1.7
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0

```

## ■ show cable dsg tunnel

```

Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 8
State : enable
Priority : 0
Dest IP : 231.1.1.8
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Client List Id : 1
Client Id : 1
Client Id Type : MAC Addr 0100.5e00.0001
Client Id : 2
Client Id Type : Application ID 0x0951
Client Id : 3
Client Id Type : Broadcast Unspecified
Client Id : 4
Client Id Type : Broadcast 4

Interface : Cable5/0
Rule Id : 1

```

**Related Commands**

| Command                                    | Description                                                                    |
|--------------------------------------------|--------------------------------------------------------------------------------|
| <b>debug cable dsg</b>                     | Enables general, DCD or packet-related debugging.                              |
| <b>show cable dsg tg</b>                   | Displays information about A-DSG tunnel groups on a Cisco CMTS router.         |
| <b>show interface</b>                      | Displays general interface information for the specified or all interfaces.    |
| <b>show interface cable dsg downstream</b> | Displays A-DSG configuration and status information for downstream interfaces. |

# show cable dsg tg

To display information about the Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnel group configuration on a Cisco CMTS router, use the **show cable dsg tg** command in privileged EXEC mode.

**show cable dsg tg** [*tunnel-group-id* {**channel** *channel-id*} [**verbose**]]

## Syntax Description

|                                  |                                                                  |
|----------------------------------|------------------------------------------------------------------|
| <i>tunnel-group-id</i>           | (Optional) Alphanumeric identifier for a specified tunnel group. |
| <b>channel</b> <i>channel-id</i> | Specifies the DSG tunnel group channel identifier.               |
| <b>verbose</b>                   | (Optional) Displays DSG tunnel group detail information.         |

## Command Default

None

## Command Modes

Privileged EXEC (#)

## Command History

| Release      | Modification                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC  | This command was introduced to support A-DSG on the Cisco uBR10012 router and Cisco uBR7200 series routers.        |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
| 12.2(33)SCD5 | This command was modified. The output of the <b>show cable dsg tg</b> command was changed.                         |

## Usage Guidelines

This command displays information for all DSG tunnel groups.

## Examples

The following is a sample output from the **show cable dsg tg** command with the configured parameters for all DSG tunnel groups:

Router# **show cable dsg tg**

| TG id | Chan id | TG state | I/F  | Rule pri | Vendor Param | UCID list |
|-------|---------|----------|------|----------|--------------|-----------|
| 1     | 1       | en       | C5/0 | 16       | 1            | 1 2 3 4   |
| 1     | 2       | en       |      | 0        |              |           |
| 2     | 1       | en       | C5/0 | 11       | 2            |           |
|       |         |          | C5/1 |          |              |           |
| 2     | 2       | en       |      | 0        |              |           |

The following is a sample output from the **show cable dsg tg 1 channel 1** command with the configured parameters for all DSG tunnel groups for the specified tunnel group and channel.

```
Router# show cable dsg tg 1 channel 1
```

```
TG Chan TG Rule Vendor UCID
id id state I/F pri Param list
1 1 en C5/0 16 1 1 2 3 4
```

The following is a sample output from the **show cable dsg tg 1 channel 1 verbose** command with the detailed information for the specified tunnel group.

```
Router# show cable dsg tg 1 channel 1 verbose
```

```
TG: 1 Chan: 1 state: en pri: 16 Vendor: 1 UCID: 1 2 3 4
 rule tunnel cfr clients
I/F id state id state mac-addr id state dest-ip In-DCD listId
C7/0/0 1 en 1 en 0101.5e01.0001 1 en 230.1.0.1 yes 1
 6 en 231.1.1.6 no
 7 en 231.1.1.7 no
 8 en 231.1.1.8 no
 2 en 2 en 0101.5e01.0002 2 en 230.1.0.2 yes 2
 3 en 3 en 0101.5e01.0003 3 en 230.1.0.3 yes 3
```

The following is sample output of the **show cable dsg tg** command that displays the **ignore** option, introduced in Cisco IOS Release 12.2(33)SCD5, under the 'In DCD' column.

```
Router# show cable dsg tg 1 channel 1 verbose
```

```
TG: 1 Chan: 1 state: en pri: 16 Vendor: 1 UCID: 1 2 3 4
 rule tunnel cfr clients
I/F id state id state mac-addr id state dest-ip In-DCD listId

C7/0/0 1 en 1 en 0101.5e01.0001 1 en 230.1.0.1 ign 1
 6 en 231.1.1.6 no
 7 en 231.1.1.7 no
 8 en 231.1.1.8 no
 2 en 2 en 0101.5e01.0002 2 en 230.1.0.2 yes 2
 3 en 3 en 0101.5e01.0003 3 en 230.1.0.3 yes 3
```

Table 1 describes the significant fields shown in the output.

**Table 62** *show cable dsg tg Field Descriptions*

| Field        | Description                           |
|--------------|---------------------------------------|
| TG           | Tunnel group identifier.              |
| Chan         | Channel identifier.                   |
| state        | Current state of the cable interface. |
| pri          | Traffic priority parameter.           |
| Vendor       | Vendor name.                          |
| UCID         | Upstream channel identifier.          |
| I/F          | Interface.                            |
| rule id      | Rule identifier.                      |
| tunnel state | Tunnel state.                         |
| mac-addr     | MAC address.                          |
| cfr state    | Classifier state.                     |

**Table 62** *show cable dsg tg Field Descriptions (continued)*

| Field          | Description                    |
|----------------|--------------------------------|
| dest-ip        | Destination IP address.        |
| In-DCD         | Downstream channel descriptor. |
| clients listId | Client list identifier.        |

#### Related Commands

| Command                                    | Description                                                                    |
|--------------------------------------------|--------------------------------------------------------------------------------|
| <b>debug cable dsg</b>                     | Enables general, DCD, or packet-related debugging.                             |
| <b>show cable dsg tunnel</b>               | Displays information about A-DSG tunnel configuration on a Cisco CMTS router.  |
| <b>show interface</b>                      | Displays general interface information for the specified or all interfaces.    |
| <b>show interface cable dsg downstream</b> | Displays A-DSG configuration and status information for downstream interfaces. |

# show cable dsg tunnel

To display information about Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnel configuration on a Cisco CMTS router, use the **show cable dsg tunnel** command in privileged EXEC mode.

**show cable dsg tunnel** *tunnel-id* [**cfrs** | **clients** | **interfaces** | **statistics** | **verbose**]

|                           |                   |                                                            |
|---------------------------|-------------------|------------------------------------------------------------|
| <b>Syntax Description</b> | <i>tunnel-id</i>  | (Optional) Alphanumeric identifier for a specified tunnel. |
|                           | <b>cfrs</b>       | Show DSG tunnel classifiers.                               |
|                           | <b>clients</b>    | Show DSG tunnel clients.                                   |
|                           | <b>interfaces</b> | Show DSG tunnel interfaces.                                |
|                           | <b>statistics</b> | Show DSG tunnel statistics.                                |
|                           | <b>verbose</b>    | Show DSG tunnel detail information.                        |

**Defaults** No default behaviors or values

**Command Modes** Privileged EXEC (#)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.3(13a)BC    | This command was introduced to support A-DSG 1.1 on the Cisco uBR10012 router and Cisco uBR7200 series routers.                                                                                                                                                                                                                                                                                                                                   |
|                        | 12.3(17a)BC    | The output was modified to support A-DSG 1.2. <ul style="list-style-type: none"> <li>The “TG id” field was added to the <b>show cable dsg tunnel</b> and <b>verbose</b> forms of the command.</li> <li>The “State” and “MAC Addr” fields switched places in the <b>show cable dsg tunnel verbose</b> form of the command.</li> <li>The “vendor group” field was added to the <b>show cable dsg tunnel clients</b> form of the command.</li> </ul> |
|                        | 12.2SB         | This command was integrated into Cisco IOS Release 12.2SB. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                                                                                                                                                     |
|                        | 12.2(33)SCC    | The command output was modified to display the cable interfaces in the MAC domain, and their SF ID values and dropped packet count for the <b>show cable dsg tunnel statistics</b> form of the command.                                                                                                                                                                                                                                           |
|                        |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Usage Guidelines** This command replaces the **show cable dsg** form of command available in Cisco IOS Release 12.3(9a)BC.

**Examples** The following example displays CLI help for **show cable dsg tunnel** command syntax.

```
Router# show cable dsg tunnel 1 ?
```

```

cfrs Show DSG tunnel classifiers
clients Show DSG tunnel clients
interfaces Show DSG tunnel interfaces
statistics Show DSG tunnel statistics
verbose Show DSG tunnel detail information
| Output modifiers
<cr>

```

### Examples: Displaying information about all A-DSG Tunnels

The following command displays tunnel MAC address, state, associated classifiers, and state information for Advanced-mode DSG version 1.1 tunnels on a Cisco CMTS router. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2 (see following example).

```
Router# show cable dsd tunnel
```

| tunnel id | tunnel state | tunnel mac-addr | cfr id | cfr state | tunnel in interface | rule id | rule state | client listId | service class |
|-----------|--------------|-----------------|--------|-----------|---------------------|---------|------------|---------------|---------------|
| 1         | en           | 0100.5e01.0114  | 1      | en        | Cable6/0            | 1       | en         | 2             | SI            |
|           |              |                 | 5      | en        |                     | 7       | en         | 10            |               |
|           |              |                 | 11     | en        |                     | 8       | en         | 2             |               |
|           |              |                 | 14     | en        |                     | 20      | en         | 2             |               |
|           |              |                 |        |           | Cable6/1            | 1       | en         | 4             |               |
|           |              |                 |        |           |                     | 3       | en         | 3             |               |
|           |              |                 |        |           |                     | 4       | en         | 4             |               |
|           |              |                 |        |           |                     | 11      | en         | 2             |               |
| 2         | en           | 0100.5e01.011e  | 2      | en        | Cable6/0            | 2       | en         | 2             | NDS-CA        |
|           |              |                 | 10     | en        |                     |         |            |               |               |
| 3         | en           | 0100.5e01.0128  | 3      | en        | Cable6/0            | 3       | en         | 3             | NDS-APP       |
| 4         | en           | 0100.5e01.0132  | 4      | en        | Cable6/0            | 4       | en         | 4             | MOTO-CA       |
| 5         | en           | 0100.5e01.013c  | 9      | en        | Cable6/0            | 5       | en         | 5             | MOTO-APP      |
|           |              |                 |        |           | Cable6/1            | 5       | en         | 5             |               |
| 6         | dis          | 0100.5e01.0146  |        |           | Cable6/0            | 6       | en         | 6             | SA-CA         |
|           |              |                 |        |           | Cable6/1            | 6       | en         | 6             |               |
| 7         | dis          | 0100.5e01.0150  | 7      | en        | Cable6/1            | 8       | en         | 7             | SA-APP        |
|           |              |                 | 13     | dis       |                     |         |            |               |               |
| 8         | en           | 0100.5e01.0119  | 8      | en        |                     |         |            |               | NDS-DNLD      |
| 9         | en           | 0100.5e01.0133  |        |           |                     |         |            |               | MOTO-DNLD     |
| 10        | en           | 0100.5e01.0147  |        |           |                     |         |            |               | SA-DNLD       |
| 11        | en           | 2222.2222.2222  |        |           |                     |         |            |               |               |
| 12        | en           | 3333.3333.3333  | 12     | en        |                     |         |            |               |               |

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the tunnel group ID ("TG id") field in support of A-DSG version 1.2 as shown below:

```
Router# show cable dsd tunnel
```

| tunnel id | tunnel state | tunnel mac-addr | TG id | cfr id | cfr state | tunnel I/F | rule id | rule state | client listId | service class |
|-----------|--------------|-----------------|-------|--------|-----------|------------|---------|------------|---------------|---------------|
| 1         | en           | 0100.5e01.0001  | 1     | 1      | en        | C5/0       | 1       | en         | 1             | DSG-Rate1     |
|           |              |                 |       | 6      | en        |            |         |            |               |               |
|           |              |                 |       | 7      | en        |            |         |            |               |               |
|           |              |                 |       | 8      | en        |            |         |            |               |               |
| 2         | en           | 0100.5e01.0002  | 1     | 2      | en        | C5/0       | 2       | en         | 2             |               |
| 3         | en           | 0100.5e01.0003  | 1     | 3      | en        | C5/0       | 3       | en         | 3             |               |
| 4         | en           | 0002.0002.0001  | 2     | 4      | en        | C5/0       | 4       | en         | 1             |               |
|           |              |                 |       |        |           | C5/1       | 1       | en         | 1             |               |
| 5         | en           | 0002.0002.0002  | 2     | 5      | en        | C5/0       | 5       | en         | 2             | DSG-Rate2     |
|           |              |                 |       |        |           | C5/1       | 2       | en         | 2             |               |
| 6         | en           | 0002.0002.0003  | 2     | 9      | en        | C5/0       | 6       | en         | 21            |               |
|           |              |                 |       |        |           | C5/1       | 3       | en         | 21            |               |

### Examples: Displaying Information for a Specified A-DSG Tunnel

The following example displays the same information as the **show cable dsd tunnel** command, but for a specified tunnel. The following example shows sample output for A-DSG version 1.1. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2 (see following example).

```
Router# show cable dsd tunnel 1
```

## ■ show cable dsg tunnel

| tunnel id | tunnel state | tunnel mac-addr | cfr id | cfr state | tunnel interface | rule id | rule state | client listId | service class |
|-----------|--------------|-----------------|--------|-----------|------------------|---------|------------|---------------|---------------|
| 1         | en           | 0100.5e01.0114  | 1      | en        | Cable6/0         | 1       | en         | 2             | SI            |
|           |              |                 | 5      | en        |                  | 7       | en         | 10            |               |
|           |              |                 | 11     | en        |                  | 8       | en         | 2             |               |
|           |              |                 | 14     | en        |                  | 20      | en         | 2             |               |
|           |              |                 |        |           | Cable6/1         | 1       | en         | 4             |               |
|           |              |                 |        |           |                  | 3       | en         | 3             |               |
|           |              |                 |        |           |                  | 4       | en         | 4             |               |
|           |              |                 |        |           |                  | 11      | en         | 2             |               |

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the tunnel group ID (“TG id”) field in support of A-DSG version 1.2 as shown below:

```
Router# show cable dsg tunnel 1
 tunnel TG cfr tunnel rule client service
id state mac-addr id id state I/F id state listId class
1 en 0100.5e01.0001 1 1 en C5/0 1 en 1 DSG-Rate1
 6 en
 7 en
 8 en
```

**Examples: Displaying Information for A-DSG Tunnel Classifiers**

The following example displays detailed information about all A-DSG classifiers associated with the specified tunnel.

```
Router# show cable dsg tunnel 1 cfrs

tunnel cfr cfr cfr destination ip source ip srcPre d_port d_port
id id state pri address address length start end
1 1 en 1 230.1.1.20 0.0.0.0 32 0 65535
 5 en 1 230.1.1.60 0.0.0.0 32 0 65535
 11 en 1 224.25.25.134 0.0.0.0 32 0 65535
 14 en 0 230.1.1.20 0.0.0.0 32 1000 2000
```

**Examples: Displaying Information for A-DSG Tunnel Clients**

The following example displays detailed information about all the clients associated with the specified tunnel for A-DSG version 1.1. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2 (see following example).

```
Router# show cable dsg tunnel 1 clients

tunnel client client client client
id listId id id type address
1 2 1 CA System ID 0X951
 3 Broadcast
 8 MAC Addr 1111.1111.1111
 3 1 Application ID 0X1
 4 1 CA System ID 0X701
 10 1 Application ID 0X6
```

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the “vendor group” field in support of A-DSG version 1.2 as shown below:

```
Router# show cable dsg tunnel 1 clients

tunnel client client client client vendor
id listId id id type address group
1 1 1 MAC Addr 0100.5e00.0001
 2 Application ID 0x0951
 3 Broadcast Unspecified
 4 Broadcast 4
```



**Examples: Displaying Information for A-DSG Tunnel Interfaces**

The following example displays all the interfaces and rules associated with a specified tunnel.

```
Router# show cable dsg tunnel 1 interfaces
tunnel downstream rule
id interface id
1 Cable6/0 1 7 8 20
 Cable6/1 1 3 4 11
```

**Examples: Displaying Information for A-DSG Tunnel Statistics**

The following example displays the packets statistics information about the specified tunnel. This output was changed in Cisco IOS Release 12.2(33)SCC (see following example).

```
Router# show cable dsg tunnel 1 statistics
tunnel cfr cfr destination ip source ip total total
id id state address address forwarded received
1 1 en 230.1.1.20 0.0.0.0 0 0
 5 en 230.1.1.60 0.0.0.0 0 0
 11 en 224.25.25.134 0.0.0.0 0 0
 14 en 230.1.1.20 0.0.0.0 0 0
```

Beginning in Cisco IOS Release 12.2(33)SCC, this output was modified to display the cable interfaces in the MAC domain, and their SF ID values and dropped packet count.

```
Router# show cable dsg tunnel 1 statistics
Load for five secs: 1%/0%; one minute: 2%; five minutes: 1%
Time source is hardware calendar, *20:07:32.543 UTC Wed Sep 14 2009

tunnel cfr cfr destination ip source ip total total
id id state address address forwarded received

1 1 en 230.1.1.20 0.0.0.0 178025 178033
 2 en 230.1.2.20 0.0.0.0 0 0

service class interface SFid dropped packets

dsg-tunnell1 Mo1/0/0:0 54 64695
 Mo1/0/0:1 56 64717
 Mo1/0/0:2 58 64731
 Mo1/0/0:3 60 64754
 Mo1/0/0:4 62 64774
 Mo1/0/0:5 64 64790
 Mo1/0/0:6 66 64812
 Mo1/0/0:7 68 64824
 Mo1/0/0:8 70 64845
 Mo1/0/0:9 72 64864
 Mo1/0/0:10 74 64880
 Mo1/0/0:11 76 64900
 Mo1/0/0:12 78 64921
 Mo1/0/0:13 80 64932
 Mo1/0/0:14 82 78249
 Mo1/0/0:15 84 78276
 Mo1/0/0:16 86 78290
 Mo1/0/0:17 88 78311
 Mo1/0/0:18 90 78330
```

**Examples: Displaying Detailed Information for a Specified A-DSG Tunnel**

The following example shows all the detailed information about a specified tunnel for A-DSG version 1.1. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2 (see following example).

Router# **show cable dsg tunnel 1 verbose**

```

Tunnel ID : 1
MAC Addr : 0100.5e01.0114
State : enable

Cfr Id : 1
State : enable
Priority : 1
Dest IP : 230.1.1.20
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 5
State : enable
Priority : 1
Dest IP : 230.1.1.60
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 11
State : enable
Priority : 1
Dest IP : 224.25.25.134
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 14
State : enable
Priority : 0
Dest IP : 230.1.1.20
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 1000
Dest Port End : 2000
Forwarded : 0
Received : 0

Client List Id : 2
Client Id : 1
Client Id Type : CA System ID: 0951
Client Id : 3
Client Id Type : Broadcast
Client Id : 8
Client Id Type : MAC Addr: 1111.1111.1111

Client List Id : 3
Client Id : 1
Client Id Type : Application ID: 0001

Client List Id : 4
Client Id : 1
Client Id Type : CA System ID: 0701

Client List Id : 10
Client Id : 1

```

```

Client Id Type : Application ID: 0006

Interface : Cable6/0
Rule Id : 1
Rule Id : 7
Rule Id : 8
Rule Id : 20
Interface : Cable6/1
Rule Id : 1
Rule Id : 3
Rule Id : 4
Rule Id : 11

```

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the “TG id” field in support of A-DSG version 1.2. The “State” and “MAC Addr” fields also switched positions in the output.

```

Router# show cable dsd tunnel 1 verbose
Tunnel ID : 1
State : enable
MAC Addr : 0100.5e01.0001

TG Id : 1

Cfr Id : 1
State : enable
Priority : 0
Dest IP : 230.1.0.1
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 6
State : enable
Priority : 0
Dest IP : 231.1.1.6
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 7
State : enable
Priority : 0
Dest IP : 231.1.1.7
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 8
State : enable
Priority : 0
Dest IP : 231.1.1.8
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

```

show cable dsg tunnel

```
Client List Id : 1
Client Id : 1
Client Id Type : MAC Addr 0100.5e00.0001
Client Id : 2
Client Id Type : Application ID 0x0951
Client Id : 3
Client Id Type : Broadcast Unspecified
Client Id : 4
Client Id Type : Broadcast 4

Interface : Cable5/0
Rule Id : 1
```

Related Commands

| Command                             | Description                                                                    |
|-------------------------------------|--------------------------------------------------------------------------------|
| debug cable dsg                     | Enables general, DCD or packet-related debugging.                              |
| show cable dsg tg                   | Displays information about A-DSG tunnel groups on a Cisco CMTS router.         |
| show interface                      | Displays general interface information for the specified or all interfaces.    |
| show interface cable dsg downstream | Displays A-DSG configuration and status information for downstream interfaces. |

# show cable dynamic-qos trace

To display the number of subscribers for whom call trace is enabled on the Cisco CMTS router, use the **show cable dynamic-qos trace** command in privileged EXEC mode.

## show cable dynamic-qos trace

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                               |                              |
|------------------------|-------------------------------|------------------------------|
| <b>Command History</b> | <b>Release</b>                | <b>Modification</b>          |
|                        | Cisco IOS Release 12.2(33)SCF | This command was introduced. |

|                         |                                                                                                                                                                                                                        |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Use the <b>show cable dynamic-qos trace</b> command after enabling the call trace functionality for PacketCable or PacketCable Multimedia (PCMM) service subscribers using the <b>cable dynamic-qos trace</b> command. |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following is a sample output of the <b>show cable dynamic-qos trace</b> command that shows the number of subscribers for whom call trace is enabled on the Cisco uBR10012 router in Cisco IOS Release 12.2(33)SCF: |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show cable dynamic-qos trace
```

```
Total number of subscribers: 0
```

```
Max configured number of subscribers: 12
```

[Table 63](#) describes the significant fields shown in the **show packetcable cms** command display.

**Table 63** *show packetcable cms Field Descriptions*

| Field                                | Description                                                                                                                     |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Total number of subscribers          | Number of subscribers for whom call trace is enabled. The number ranges from 0 to the maximum configured number of subscribers. |
| Max configured number of subscribers | Maximum number of subscribers for whom call trace can be enabled at any point of time.                                          |

 show cable dynamic-qos trace

| Related Commands | Command                                   | Description                                                                                                      |
|------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dynamic-qos trace</b>            | Enables the call trace functionality on the Cisco CMTS router for PacketCable or PCMM service subscribers.       |
|                  | <b>debug cable dynamic-qos subscriber</b> | Enables debugging of the call trace functionality on the Cisco CMTS router for a particular subscriber.          |
|                  | <b>debug cable dynamic-qos trace</b>      | Enables call trace debugging on the Cisco CMTS router for all the subscribers for whom call trace is configured. |

# show cable fiber-node

To display information about a fiber node, use the **show cable fiber-node** command in privileged EXEC mode.

**show cable fiber-node** *fiber-node-id* [**spectrum**]

|                    |                      |                                                                                           |
|--------------------|----------------------|-------------------------------------------------------------------------------------------|
| Syntax Description | <i>fiber-node-id</i> | Specifies a fiber node ID. Valid values range from 1 to 256.                              |
|                    | <b>spectrum</b>      | Displays upstream channel frequency assignment information and the spectrum group number. |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                                                                 |
|-----------------|----------------|-----------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                             |
|                 | 12.3BC         | This command was introduced                                     |
|                 | 12.2(33)SCC    | This command was integrated into Cisco IOS Release 12.2(33)SCC. |

**Usage Guidelines**

Use the **show cable fiber-node** command to display information about a fiber node, such as the fiber node status. If you specify the **spectrum** parameter, the command displays upstream channel frequency assignment information and the spectrum group number.

For each fiber node, a traditional DOCSIS downstream channel on a Cisco uBR10-MC5X20 cable interface line card is used to carry MAC management and signaling messages. This traditional DOCSIS downstream channel used for a MAC domain is called the *primary downstream channel*. The associated traditional DOCSIS upstream channel is used for return data traffic and signaling.

**Examples**

The following is a sample output of the **show cable fiber-node** command:

```
Router# show cable fiber-node 2
Fiber-Node Config Status
Fiber-Node 2
 downstream Modular-Cable 1/0/0: 0-3
 downstream Cable 7/1/0
 upstream Cable 7/1: 10-19
 FN Config Status: Configured (status flags = 0x01)
 MDD Status: Valid
Router#
```

Table 64 describes the fields shown in the show cable fiber-node command display.

**Table 64** show cable fiber-node Field Descriptions

| Field         | Description                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fiber-Node    | Displays the fiber nodes configured on the CM.                                                                                                                                                                                                                                                                                                                                                                      |
| Config Status | Displays the configuration status of the fiber node. Status flags are as follows: <ul style="list-style-type: none"> <li>• 0x01 - CMTS_FN_CONFIG</li> <li>• 0x02 - CMTS_FN_FREQ_INVALID</li> <li>• 0x04 - CMTS_FN_CHID_INVALID</li> <li>• 0x08 - CMTS_FN_BUNDLE_INVALID</li> <li>• 0x10 - CMTS_FN_BOND_CHID_INVALID</li> <li>• 0x20 - CMTS_FN_US_FREQ_INVALID</li> <li>• 0x40 - CMTS_FN_NO_US_CONFIGURED</li> </ul> |
| MDD Status    | Displays the MAC Domain Descriptor (MDD) status. MDD status of a fiber node is set as invalid in the following cases: <ul style="list-style-type: none"> <li>• Frequency is not unique.</li> <li>• Channel ID is not unique.</li> <li>• Bonding group ID is not unique.</li> <li>• Bundle is mismatched.</li> </ul>                                                                                                 |

```
Router# show cable fiber-node 2 spectrum
Fiber Upstream Physical Frequency Spectrum
Node No. Port Port (MHz) Group No.

2 Cable7/1/0 U0 10 21.939 [1.6] 1
2 Cable7/1/0 U1 11 10.695 [1.6] 1
2 Cable7/1/0 U2 12 5.834 [1.6] 1
2 Cable7/1/0 U3 13 9.055 [1.6] 1
2 Cable7/1/4 U0 16 unassigned No
2 Cable7/1/4 U1 17 unassigned No
2 Cable7/1/4 U2 18 unassigned No
2 Cable7/1/4 U3 19 unassigned No
```

Table 65 describes the fields shown in the show cable load-balance command display when the spectrum keyword is used.

**Table 65** show cable fiber-node Field Descriptions

| Field              | Description                                                                                                                                                                                                                |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Upstream Port      | Displays the upstream port associated with the fiber node.                                                                                                                                                                 |
| Physical Port      | Displays the physical port of the upstream channel.                                                                                                                                                                        |
| Frequency          | Displays the upstream channel frequency of the CM.                                                                                                                                                                         |
| Spectrum Group No. | Displays the spectrum group number of the fiber node. A spectrum group is a list of upstream frequencies and nominal power levels. Spectrum groups ranging from 1 to 32 can be created for each cable modem upstream port. |



| Related Commands | Command                          | Description                                                                                          |
|------------------|----------------------------------|------------------------------------------------------------------------------------------------------|
|                  | <b>show cable modem</b>          | Displays information for registered and unregistered cable modems (including wideband cable modems). |
|                  | <b>show cable modem wideband</b> | Displays information for registered and unregistered wideband cable modems.                          |

# show cable filter

To display the DOCSIS 1.1 filter groups that are currently defined, use the **show cable filter** command in user EXEC or privileged EXEC mode.

**show cable filter** [**group** *group-index* [**index** *index-num*]] [**verbose**]

## Syntax Description

|                               |                                                                                                                                                                                   |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>group</b> <i>group-id</i>  | (Optional) Specifies the filter group to be displayed. The valid range is 1 to 256.                                                                                               |
| <b>index</b> <i>index-num</i> | (Optional) Specifies the index of the particular filter within a group to be displayed. The valid range is 1 to 128 on a uBR7200 series router and 1 to 255 on a uBR10012 router. |
| <b>verbose</b>                | (Optional) Displays complete information about the filter groups in a format that is easier to read than the default display.                                                     |

## Command Modes

User EXEC, Privileged EXEC (#)

## Command History

| Release               | Modification                                                                                                                                                                                                                                       |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(6)EC1            | This command was introduced on the Cisco uBR7100 series and Cisco uBR7200 series routers.                                                                                                                                                          |
| 12.2(2)XF, 12.2(4)BC1 | This command was supported on the Cisco uBR10012 routers.                                                                                                                                                                                          |
| 12.2(8)BC2            | An option was added to the <b>cable filter group</b> command to allow filter groups to be activated and deactivated without removing the filter group's configuration.                                                                             |
| 12.2(33)SCA           | The output was changed to add fields for IPv6 information, including the "v6" field in the <b>show cable filter</b> command, and the "Source IPv6 Address," and "Destination IPv6 Address" fields of the <b>show cable filter verbose</b> command. |

## Examples

The following example shows a typical display of the **show cable filter** command:

Router# **show cable filter**

| Filter<br>Grp | Id | SrcAddr/Mask    | DestAddr/Mask   | Prot | ToS | SPort | DPort | TCP<br>Flags | Action | Status |
|---------------|----|-----------------|-----------------|------|-----|-------|-------|--------------|--------|--------|
| 1             | 1  |                 |                 | 256  |     |       | 137   | 0,0          | drop   | active |
| 1             | 2  |                 | 10.37.11.151/24 | 6    |     |       | 23    | 2,0          | drop   | active |
| 1             | 3  |                 |                 | 17   |     | 68    | 67    | 0,0          | drop   | active |
| 1             | 4  |                 |                 | 256  |     |       | 161   | 0,0          | drop   | active |
| 1             | 5  |                 |                 | 256  |     |       | 53    | 0,0          | drop   | active |
| 1             | 6  |                 | 10.37.11.151/29 | 256  |     |       |       |              | accept | active |
| 1             | 7  | 10.37.11.196/29 | 10.11.0.98/32   | 256  |     |       |       |              | accept | active |
| 1             | 8  | 10.37.11.195/32 | 10.11.0.98/32   | 6    |     |       |       |              | drop   | active |
| 1             | 9  | 10.37.11.195/32 | 10.11.0.98/32   | 256  |     |       |       |              | accept | active |
| 1             | 10 | 10.37.11.194/32 | 10.11.0.98/16   | 6    |     |       |       |              | accept | active |
| 1             | 11 | 10.37.11.193/32 | 10.11.0.98/8    | 17   |     |       |       |              | drop   | active |
| 1             | 12 | 10.37.11.192/32 | 10.11.0.98/32   | 6    | F,F |       |       |              | accept | active |

```

1 13 10.37.11.191/32 10.11.0.98/32 17 F,F accept active
1 14 10.37.11.190/32 10.11.0.98/24 17 8,F accept active
1 15 10.37.11.189/32 10.11.0.98/32 256 F,8 drop active
1 16 10.37.11.189/32 10.11.0.98/32 256 F,8 accept active
1 17 10.37.11.188/32 10.11.0.98/8 17 accept active
1 18 10.37.11.188/32 10.11.0.98/32 6 drop active
1 19 10.37.11.187/32 10.11.0.98/30 256 accept active
1 20 10.11.0.98/0 256 drop active
Router#

```

The following shows typical output for the verbose form of this command:

```

Router# show cable filter group 10 index 10 verbose
Filter Group : 1
Filter Index : 1
Matches : 0
 Match action : accept
 Status : active

Filter Group : 10
Filter Index : 10
Matches : 0
 Source IP Address : 10.7.7.7/16
 Destination IP Address : 10.8.8.8/16
 IP Protocol type : 256
 IP ToS (Mask, Value) : 1, 2
 TCP/UDP Source Port : 2000
 TCP/UDP Destination Port : 3000
 TCP Flags (mask, value) : 0, 0
 Match action : accept
 Status : active
Router#

```

### IPv6 Examples

The following examples show examples of output for the **show cable filter** commands with changes beginning in Cisco IOS Release 12.2(33)SCA in support of IPv6 cable filter groups. [Table 66](#) describes the output fields.

```

Router# show cable filter
Filter SrcAddr/Mask DestAddr/Mask Prot ToS SPort DPort TCP Action Status
Grp Id v6 Flags

254 128Y Use Verbose Use Verbose drop active

Router# show cable filter group 254
Filter SrcAddr/Mask DestAddr/Mask Prot ToS SPort DPort TCP Action Status
Grp Id v6 Flags

254 128Y Use Verbose Use Verbose drop active

Router# show cable filter group 254 index 128
Filter SrcAddr/Mask DestAddr/Mask Prot ToS SPort DPort TCP Action Status
Grp Id v6 Flags

254 128Y Use Verbose Use Verbose drop active

```

**Table 66** *show cable filter Field Descriptions*

| Field         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Filter Gp     | ID number of the filter group. Defined by the <i>group-id</i> argument of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                            |
| Filter Id     | Index number of the filter group. Defined by the <i>index-num</i> argument of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                        |
| v6            | IP version 6 filter group type indicator. Defined by the <b>ip-version</b> keyword of the <b>cable filter group</b> command. Possible values are Y or N.                                                                                                                                                                                                                                                                                    |
| SrcAddr/Mask  | <ul style="list-style-type: none"> <li>IP version 4—Filter source IP address and mask to be matched by the filter. Defined by the <b>src-ip</b> and <b>src-mask</b> keywords of the <b>cable filter group</b> command..</li> <li>IP version 6—“Use Verbose” appears because IPv6 addresses will not fit in the output display area; need to use the <b>show cable filter group verbose</b> command to view IPv6 addresses.</li> </ul>       |
| DestAddr/Mask | <ul style="list-style-type: none"> <li>IP version 4—Filter destination IP address and mask to be matched by the filter. Defined by the <b>dest-ip</b> and <b>dest-mask</b> keywords of the <b>cable filter group</b> command.</li> <li>IP version 6—“Use Verbose” appears because IPv6 addresses will not fit in the output display area; need to use the <b>show cable filter group verbose</b> command to view IPv6 addresses.</li> </ul> |
| Prot          | IP protocol number(s) to be matched by the filter. Defined by the <b>ip-proto</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                         |
| ToS           | Type of Service mask and value to be matched by the filter. Defined by the <b>ip-tos</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                  |
| SPort         | TCP/UDP source port number to be matched by the filter. Defined by the <b>src-port</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                    |
| DPort         | TCP/UDP destination port number to be matched by the filter. Defined by the <b>dest-port</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                              |
| TCP Flags     | TCP flag mask and value to be matched by the filter. Defined by the <b>tcp-flags</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                      |
| Action        | Action to be taken on packet (accept or drop) when filter match occurs. Defined by the <b>match-action</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                |
| Status        | Filter group status (active or inactive). Defined by the <b>status</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                    |

```

Router# show cable filter group 254 index 128 verbose
Filter Group : 254
Filter Index : 128
Filter Version : IPv6
Matches : 0
 Source IPv6 address : 2001:33::20B:BFFF:FEA9:741F/128
 Destination IPv6 address : 2001:1::224/128
 Match action : drop
 Status : active

```

Table 67 describes the output fields.

**Table 67** *show cable filter verbose Field Descriptions*

| Field                                                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Filter Group                                                            | ID number of the filter group. Defined by the <i>group-id</i> argument of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                                                          |
| Filter Index                                                            | Index number of the filter group. Defined by the <i>index-num</i> argument of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                                                      |
| Filter Version                                                          | IP version of the filter group. Defined by the <b>ip-version</b> keyword of the <b>cable filter group</b> command. Possible values are IPv4 or IPv6.                                                                                                                                                                                                                                                                                                                      |
| Matches: Source IP address or<br>Matches: Source IPv6 address           | <ul style="list-style-type: none"> <li>Source IP address—IPv4 source IP address and mask to be matched by the filter. Defined by the <b>src-ip</b> and <b>src-mask</b> keywords of the <b>cable filter group</b> command.</li> <li>Source IPv6 address—IPv6 source IP address and prefix to be matched by the filter. Defined by the <b>v6-src-address</b> and <b>v6-src-pfxlen</b> keywords of the <b>cable filter group</b> command.</li> </ul>                         |
| Matches: Destination IP address or<br>Matches: Destination IPv6 address | <ul style="list-style-type: none"> <li>Destination IP address—IPv4 destination IP address and mask to be matched by the filter. Defined by the <b>dest-ip</b> and <b>dest-mask</b> keywords of the <b>cable filter group</b> command.</li> <li>Destination IPv6 address—IPv6 destination IP address and prefix to be matched by the filter. Defined by the <b>v6-dest-address</b> and <b>v6-dest-pfxlen</b> keywords of the <b>cable filter group</b> command.</li> </ul> |
| Matches: IP Protocol type                                               | IP protocol number(s) to be matched by the filter. Defined by the <b>ip-proto</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                                       |
| Matches: IP ToS (Mask, Value)                                           | Type of Service mask and value to be matched by the filter. Defined by the <b>ip-tos</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                                |
| Matches: TCP/UDP Source Port                                            | TCP/UDP source port number to be matched by the filter. Defined by the <b>src-port</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                                  |
| Matches: TCP/UDP Destination Port                                       | TCP/UDP destination port number to be matched by the filter. Defined by the <b>dest-port</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                            |
| Matches: TCP Flags (mask, value)                                        | TCP flag mask and value to be matched by the filter. Defined by the <b>tcp-flags</b> keyword of the <b>cable filter group</b> command.                                                                                                                                                                                                                                                                                                                                    |

**Table 67** *show cable filter verbose Field Descriptions*

| Field                 | Description                                                                                                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Matches: Match action | Action to be taken on packet (accept or drop) when filter match occurs. Defined by the <b>match-action</b> keyword of the <b>cable filter group</b> command. |
| Matches: Status       | Filter group status (active or inactive). Defined by the <b>status</b> keyword of the <b>cable filter group</b> command.                                     |

**Related Commands**

| Command                   | Description                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>cable filter group</b> | Creates, configures, and activates a DOCSIS 1.1 filter group that filters packets on the basis of the TCP/IP and UDP/IP headers. |

# show cable flap-list

To display the cable flap-list on a Cisco CMTS, use the **show cable flap-list** command in user EXEC or privileged EXEC mode.

**show cable flap-list**

**show cable flap-list** [**cable** *slot/port* | **cable** *slot/subslot/port*] [**upstream** *port*] [**sort-flap** | **sort-time**]

**show cable flap-list sort-interface** [**sort-flap** | **sort-time**]

| Syntax Description                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b> <i>slot/port</i>         | (Optional) Displays information for all CMs on the specified cable interface and downstream port on the Cisco uBR7100 series and Cisco uBR7200 series routers: <ul style="list-style-type: none"><li>• <i>slot</i>—Chassis slot number of the cable interface line card.</li><li>• <i>port</i>—Downstream port number.</li></ul> Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
| <b>cable</b> <i>slot/subslot/port</i> | (Optional) Displays information for all CMs on the specified cable interface on a Cisco uBR10012 router: <ul style="list-style-type: none"><li>• <i>slot</i>—Chassis slot number of the cable interface line card. Valid slots are from 5 to 8.</li><li>• <i>subslot</i>—Secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li><li>• <i>port</i>—Downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li></ul>                                                                             |
| <b>upstream</b> <i>port</i>           | (Optional) Displays the flap list for a particular upstream on the selected cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>sort-interface</b>                 | (Optional) Displays the flap list for all cable interfaces, sorted by interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>sort-flap</b>                      | (Optional) Sorts the list by the number of times the CM has flapped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>sort-time</b>                      | (Optional) Sorts the list by the most recent time the CM is detected to have flapped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|                      |                                    |
|----------------------|------------------------------------|
| <b>Command Modes</b> | User EXEC (>), Privileged EXEC (#) |
|----------------------|------------------------------------|

| Command History | Release  | Modification                                              |
|-----------------|----------|-----------------------------------------------------------|
|                 | 11.3 NA  | This command was introduced.                              |
|                 | 12.0(3)T | This command was supported on the Cisco mainline release. |

| Release                  | Modification                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(7)XR and 12.1(1a)T1 | The output of this command was enhanced to show that the Cisco CMTS has detected an unstable return path for a particular CM and has compensated with a power adjustment. An asterisk (*) appears in the power adjustment field for a modem when a power adjustment has been made; an exclamation point (!) appears when the CM has reached its maximum power transmit level and cannot increase its power level further. |
| 12.2(33)SCA              | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                                                                                                                        |
| 12.2(33)SCC              | The output of this command was modified to show the aggregated data across all upstream channels for each flap detector for CMs in the Multiple Transmit Channel (MTC) mode on a Cisco uBR10012 router.                                                                                                                                                                                                                   |

### Usage Guidelines

The **sort** options operate differently on the different Cisco CMTS routers. On the Cisco uBR7100 series and Cisco uBR7200 series routers, the **sort** options apply to all cable interface line cards and merge the output into a single display.

On the Cisco uBR10012 router, the sort options apply to individual cable interfaces. For example, the **sort-time** option sorts all of the flap entries on the first cable interface (c5/0/0), then the entries on the second cable interface (c5/0/1), and so forth.



#### Note

Occasionally, the **show cable flap-list** command might temporarily show duplicate entries for the same cable modem. This can occur after a cable modem has gone offline and before it has completed the registration process and come back online. When the cable modem does reach the online state, the duplicate entries disappear.



#### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

### Examples

The following example shows the output of the **show cable flap-list** command:

```
router# show cable flap-list
```

| MAC Address    | Upstream    | Ins | Hit  | Miss | CRC | P-Adj | Flap | Time            |
|----------------|-------------|-----|------|------|-----|-------|------|-----------------|
| 0010.7bb3.fd19 | Cable5/0/U1 | 0   | 2792 | 281  | 0   | *45   | 58   | Jul 27 16:54:50 |
| 0010.7bb3.fcfc | Cable5/0/U1 | 0   | 19   | 4    | 0   | !43   | 43   | Jul 27 16:55:01 |
| 0010.7bb3.fcd0 | Cable5/0/U1 | 0   | 19   | 4    | 0   | *3    | 3    | Jul 27 16:55:01 |



#### Note

The asterisk (\*) in the P-Adj field indicates that a power adjustment has been made for that CM. The exclamation point (!) indicates that the CM has reached its maximum power transmit level and cannot increase its power level further.

The following example shows the display of flap-list tables sorted by MAC address:

```
router# show cable flap-list sort-flap
```

| Mac Addr       | CableIF | Ins | Hit | Miss | CRC | P-Adj | Flap | Time            |
|----------------|---------|-----|-----|------|-----|-------|------|-----------------|
| 0010.1eab.2c0b | C6/0 U0 | 108 | 318 | 27   | 0   | 0     | 108  | Sep 10 15:26:56 |
| 0010.1eb2.bb07 | C6/0 U0 | 0   | 293 | 31   | 1   | 1     | 1    | Sep 10 15:15:49 |



```

0010.7b6b.71cd C6/0 U0 1 288 32 0 0 1 Sep 10 15:12:13
0010.1eb2.bb8f C6/0 U0 1 295 30 0 0 1 Sep 10 15:11:44

```

The following example shows the display of flap-list tables sorted by time:

```
Router# show cable flap-list sort-time
```

```

Mac Addr CableIF Ins Hit Miss CRC P-Adj Flap Time
00e0.2222.2202 C4/0 U0 464 2069 242 0 421 885 Oct 16 22:47:23
0010.7b6b.57e1 C4/0 U0 0 2475 43 0 1041 1041 Oct 16 22:47:04

```

The following sample output of the **show cable flap-list** command provides the aggregated data across all upstream channels for CMs in the MTC mode on a uBR10012 router in Cisco IOS Release 12.2(33)SCC:

```
router# show cable flap-list
```

```

MAC Address Upstream Ins Hit Miss CRC P-Adj Flap Time
001e.6bfb.0f9e C5/0/0/UB 0 62539 0 0 2 2 Apr 18 03:53:00
0050.f110.b277 C5/0/0/UB 0 10965 211 0 0 9 Apr 18 03:53:00

```

Table 1 describes the significant fields shown in the display.

**Table 68** *show cable flap-list Command Field Descriptions*

| Field    | Description                                                     |
|----------|-----------------------------------------------------------------|
| Mac Addr | The MAC address for the CM.                                     |
| CableIF  | The cable interface line card, including upstream, for this CM. |

**Table 68** *show cable flap-list Command Field Descriptions (continued)*

| Field | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ins   | <p>The number of times the CM comes up and inserts itself into the network. This counter indicates the number of times the RF link was abnormally reestablished into the network. This counter is increased when the time between initial link establishment and a reestablishment was less than the threshold parameter configured using the <b>cable flap-list insertion-time</b> command.</p> <p>Normal modem activity uses the following sequence:</p> <ul style="list-style-type: none"> <li>• Initial link insertion is followed by a station maintenance message between the CMTS and cable modem.</li> <li>• Power on</li> <li>• Initial maintenance</li> <li>• Station maintenance</li> <li>• Power off</li> </ul> <p>When the link is broken, initial maintenance is repeated to reestablish the link.</p> <ul style="list-style-type: none"> <li>• Initial maintenance @ Time T1</li> <li>• Station maintenance</li> <li>• Initial maintenance @ Time T2</li> </ul> <p>The Ins and Flap counters in the flap list are incremented whenever <math>T2 - T1 &lt; N</math> where <math>N</math> is the insertion-time parameter configured in the <b>cable flap-list insertion-time</b> command.</p> <p>This count may indicate intermittent downstream synchronization loss or DHCP or modem registration problems. In the latter case, the Ins count tends to track the Flap count. If the downstream is unstable (levels move outside the modem's range occasionally), insertions can occur. If the modem cannot provision correctly, many insertions occur.</p> <p>If link reestablishment happens too frequently, the modem usually has a registration problem. To check for this potential problem, check to see if the insertion counter is the same order of magnitude as the Flap counter.</p> |
| Hit   | The number of times the CM responds to MAC-layer station maintenance (keepalive) messages. (The minimum hit rate is once per 30 seconds. It can indicate intermittent upstream, laser clipping, or common-path distortion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Miss  | The number of times the CM misses and does not respond to a MAC-layer station maintenance (keepalive) message. An 8 percent miss rate is normal for the Cisco cable interface line cards. It can indicate intermittent upstream, laser clipping, or common-path distortion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Table 68 *show cable flap-list Command Field Descriptions (continued)*

| Field       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | <p>The Hit and Miss columns are keepalive polling statistics between the CMTS and the cable modem. The station maintenance process occurs for every modem approximately every 25 seconds. When the CMTS receives a response from the modem, the event is counted as a hit. If the CMTS does not receive a response from the cable modem, the event is counted as a miss.</p> <p>Ideally, the hit count should be much greater than the miss count. If a modem has a hit count much less than its miss count, then registration is failing. Noisy links cause the miss or hit ratio to deviate from a nominal 10 percent or less. High miss counts can indicate:</p> <ul style="list-style-type: none"> <li>– Intermittent upstream possibly due to noise</li> <li>– Laser clipping</li> <li>– Common-path distortion</li> <li>– Ingress or interference</li> <li>– Too much or too little upstream attenuation</li> </ul> <p>A cable modem fails to respond either because of noise or if it is down. Modems that log only misses and zero hits are assumed to be powered off. If noise caused a poll to be missed, then the transition from miss to hit is detected as a flap condition. The poll rate is increased to 1 per second whenever the modem misses a poll. This is used to accelerate the offline state detection and decrease station maintenance overhead.</p> <p>Misses are not desirable, because they usually indicate a return path problem; however, having a small number of misses is normal. After 16 misses, the modem is assumed to have powered off and the link is broken.</p> <p>The flap count is incremented if there are <i>M</i> consecutive misses, where <i>M</i> is configured in the <b>cable flap miss-threshold</b> command. The parameter value ranges from 1 to 12, with a default of 6.</p> <p>Hit and miss analysis could be done after the Ins count stops incrementing. In general, if the hit and miss counts are about the same order of magnitude, and the CRC count is low or nonexistent, then the upstream is experiencing noise.</p> <p>If the miss count is greater, then the modem is probably experiencing common-path distortion and is dropping out frequently or not completing registration. Check grounding connections and if you see noise disappear after breaking a cable connection, but build back up again later, check the end-of-line terminators. You may be using a substandard frequency translator instead of a Digital Signal Processor. If the line is simply noisy, but not too noisy, you see an increase in the percentage of misses. If it is very noisy, then more than 80% of the ranging responses (RNG-RSP) are missed and the modem has many insertions.</p> |
| CRC         | <p>The number of cyclic redundancy check (CRC) errors for this cable modem. CRC errors are calculated on per modem basis and refer to upstream impairments. Cable modems with high CRC errors either have bad upstream paths, or have in-home wiring problems.</p> <p>The CRC counter field indicates:</p> <ul style="list-style-type: none"> <li>• Intermittent upstream</li> <li>• Laser clipping</li> <li>• Common-path distortion</li> <li>• Impulsive noise or interference</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 68** *show cable flap-list Command Field Descriptions (continued)*

| Field | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P-Adj | <p>The number of times the headend instructed the CM to adjust transmit (TX) power more than 3 dB. It can indicate amplifier degradation, poor connections, or thermal sensitivity.</p> <p>* means the noise power-adjustment method is active for this modem.</p> <p>! means the modem has reached its maximum transmit power.</p> <p>The station maintenance poll in the CMTS constantly adjusts the modem transmit power, frequency, and timing. The power-adjustment (P-Adj) column indicates the number of times the modem's power adjustment exceeded the threshold value. The power adjustment threshold may be set using the <b>cable flap-list power-adjust threshold</b> command with a value range of 0 to 10 dB and a default value of 2 dB. Tuning this threshold is recommended to decrease irrelevant entries in the flap list. Power-adjustment values of 2 dB and below continuously increment the P-Adj counter. The modem transmitter step size is 1.5 dB, whereas the headend may command 0.25 dB step sizes.</p> <p>Power-adjustment flap strongly suggests upstream plant problems such as:</p> <ul style="list-style-type: none"> <li>• Amplifier degradation</li> <li>• Poor connections</li> <li>• Thermal sensitivity</li> <li>• Attenuation problem</li> </ul> <p>The P-Adj column is often watched as an indicator of plant stability. It may give a forewarning of a future plant outage. If the upstream path contains too much or too little loss, the modem is undergoing many power adjustments.</p> |
| Flap  | <p>The total number of times a modem has flapped, which is the sum of P-Adj and Ins values. This counter is incremented when one of the following events is detected:</p> <ul style="list-style-type: none"> <li>• Unusual modem insertion or re-registration attempts. The Flap and the Ins counters are incremented when the modem tries to reestablish the RF link with the CMTS within a period of time that is less than the user-configured insertion interval value.</li> <li>• Abnormal miss or hit ratio. The Flap counter is incremented when <i>N</i> consecutive misses are detected after a hit where <i>N</i> can be user-configured with a default value of 6.</li> <li>• Unusual power adjustment. The Flap and P-Adj counters are incremented when the modem's upstream power is adjusted beyond a user-configured power level.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Time  | <p>Time is the most recent time that the modem dropped the connection or flapped. The value is based on the clock configured on the local CMTS. If no time is configured, this value is based on the current uptime of the CMTS. When a cable modem meets one of the three flap list criteria, the Flap counter is incremental and Time is set to the current time.</p> <p><b>Note</b> This field displays a value in brackets in the output of the <b>show cable modem flap</b> command to indicate the duration (milliseconds) between the cable interface to become active and the first ranging success after a line card switchover (cable modem recovery time).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Related Commands | Command                                       | Description                                                                                               |
|------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                  | <b>cable flap-list aging</b>                  | Specifies the number of days to keep a CM in the flap-list table before aging it out of the table.        |
|                  | <b>cable flap-list insertion-time</b>         | Sets the insertion time interval that determines whether a CM is placed in the flap list.                 |
|                  | <b>cable flap-list miss-threshold</b>         | Specifies the miss threshold for recording a flap-list event.                                             |
|                  | <b>cable flap-list power-adjust threshold</b> | Specifies the power-adjust threshold for recording a CM flap-list event.                                  |
|                  | <b>cable flap-list size</b>                   | Specifies the maximum number of CMs that can be listed in the flap-list table.                            |
|                  | <b>clear cable flap-list</b>                  | Clears all the entries in the flap-list table.                                                            |
|                  | <b>debug cable flap</b>                       | Displays information about the operation of the CM flap list that is maintained for the cable interfaces. |
|                  | <b>ping docsis</b>                            | Sends a DOCSIS ping to a CM and increments the flap-list counters as appropriate.                         |
|                  | <b>show cable modem</b>                       | Displays information about all CMs on an interface or about a particular CM.                              |
|                  | <b>show cable modem flap</b>                  | Displays flap list statistics for one or more cable modems.                                               |

# show cable flap-list wb-rf

To display the wideband RF related data for all w-online cable modems, use the **show cable flap-list wb-rf** command in privileged EXEC mode.

```
show cable flap-list [cable slot/subslot/port] wb-rf [modular-cable slot/bay/port |
integrated-cable slot/bay/port WB RF channel number] [QAM | MDD]
```

|                    |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>cable</b> <i>slot/subslot/port</i>        | (Optional) Displays information for all CMs on the specified cable interface on a Cisco uBR10012 router, where: <ul style="list-style-type: none"><li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li><li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li><li><i>port</i>—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li></ul> |
|                    | <b>modular-cable</b> <i>slot/bay/port</i>    | (Optional) Displays information for all CMs on the specified modular cable interface on a Cisco uBR10012 router, where <ul style="list-style-type: none"><li><i>slot</i>—The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs.</li><li><i>bay</i>—The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).</li><li><i>port</i>—Specifies the interface number on the SPA.</li></ul>                                                               |
|                    | <b>integrated-cable</b> <i>slot/bay/port</i> | (Optional) Displays information for all CMs on the specified integrated cable interface on a Cisco uBR10012 router, where <ul style="list-style-type: none"><li><i>slot</i>—The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs.</li><li><i>bay</i>—The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).</li><li><i>port</i>—Specifies the interface number on the SPA.</li></ul>                                                            |
|                    | <i>WB RF channel number</i>                  | (Optional) Specifies the wideband RF channel number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                    | <b>QAM</b>                                   | (Optional) Specifies the number of QAM flaps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                    | <b>MDD</b>                                   | (Optional) Specifies the number of MDD flaps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Command Modes Privileged EXEC (#)

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCB | This command was introduced. |

Usage Guidelines None

## Examples

The following is a sample output of the **show cable flap-list wb-rf** command:

```
router# show cable flap-list wb-rf
```

| RF    | Timeout | Recover | Failure | Recover | Flaps | CM | Percent |
|-------|---------|---------|---------|---------|-------|----|---------|
| 3/0/0 | 1       | 1       | 0       | 0       | 1     | 3  | 33      |
|       | 2       | 0       | 1       | 0       | 1     | 3  | 33      |

## Related Commands

| Command                      | Description                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>show cable flap-list</b>  | Displays the cable flap-list on a Cisco CMTS.                                                             |
| <b>clear cable flap-list</b> | Clears all the entries in the flap-list table.                                                            |
| <b>debug cable flap</b>      | Displays information about the operation of the CM flap list that is maintained for the cable interfaces. |
| <b>show cable modem flap</b> | Displays flap list statistics for one or more cable modems.                                               |

# show cable hop

To display cable-hop statistics on a Cisco CMTS, use the **show cable hop** command in privileged EXEC mode.

**show cable hop** [*cable slot/port*] [*upstream uport*] [*history*] [*threshold*]

**show cable hop** [*cable slot/subslot/port*] [*upstream uport*] [*history*] [*threshold*]

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <p><b>cable</b> <i>slot/port</i> (Optional) Specifies a cable interface on the Cisco uBR7100 series and Cisco uBR7200 series routers.</p> <p>On the Cisco uBR7100 series router, the only valid value is <b>1/0</b>. On the Cisco uBR7200 series router, <i>slot</i> can range from 3 to 6, and <i>port</i> can be 0 or 1, depending on the cable interface.</p>                                                                                                                                                                        |
|                           | <p><b>cable</b> <i>slot/subslot/port</i> (Optional) Specifies a cable interface on the Cisco uBR10012 router. The following are the valid values:</p> <ul style="list-style-type: none"> <li><i>slot</i>—Chassis slot number of the cable interface line card. Valid slots are from 5 to 8.</li> <li><i>subslot</i>—Secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Downstream port number. Valid ports are from 0 to 4, depending on the cable interface line card.</li> </ul> |
|                           | <p><b>upstream</b> <i>uport</i> (Optional) Specifies an upstream port for which to display the frequency hop status.</p>                                                                                                                                                                                                                                                                                                                                                                                                                |
|                           | <p><b>history</b> (Optional) Displays changes from one state to another, at any time and for any reason, for frequency, modulation, and channel width.</p>                                                                                                                                                                                                                                                                                                                                                                              |
|                           | <p><b>threshold</b> (Optional) Displays the user defined thresholds and current carrier-to-noise ratio (CNR), signal-to-noise ratio (SNR), correctable forward error correction (FEC) percentage, uncorrectable FEC percentage, and missed station maintenances percentage values of the upstreams.</p>                                                                                                                                                                                                                                 |

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| <b>Command History</b> | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>12.0(4)XI</td><td>This command was introduced.</td></tr> <tr> <td>12.3(13a)BC</td><td>This command was enhanced with the addition of two new keywords, <b>history</b> and <b>threshold</b>.</td></tr> <tr> <td>12.2(33)SCA</td><td>This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.</td></tr> </table> | Release | Modification | 12.0(4)XI | This command was introduced. | 12.3(13a)BC | This command was enhanced with the addition of two new keywords, <b>history</b> and <b>threshold</b> . | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-----------|------------------------------|-------------|--------------------------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------|
| Release                | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |              |           |                              |             |                                                                                                        |             |                                                                                                                    |
| 12.0(4)XI              | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |              |           |                              |             |                                                                                                        |             |                                                                                                                    |
| 12.3(13a)BC            | This command was enhanced with the addition of two new keywords, <b>history</b> and <b>threshold</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |              |           |                              |             |                                                                                                        |             |                                                                                                                    |
| 12.2(33)SCA            | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |              |           |                              |             |                                                                                                        |             |                                                                                                                    |



| Release     | Modification                                                                                                                                                                                                                                                      |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC7 | The output of the <b>show cable hop history</b> command is modified to include more information in the 'change from' and 'change to' fields of the output. Now, the modulation profile number is displayed when a change occurs, instead of the modulation order. |
| 12.2(33)SCC | This command was integrated into Cisco IOS Release 12.2(33)SCC.                                                                                                                                                                                                   |

## Examples

The following example shows typical output from the **show cable hop** command:

```
Router# show cable hop
```

| Upstream Port | Port Status | Poll Rate (ms) | Missed Poll Count | Min Poll Sample | Missed Poll Pcnt | Hop Thres Pcnt | Hop Period (sec) | Corr FEC Errors | Uncorr FEC Errors |
|---------------|-------------|----------------|-------------------|-----------------|------------------|----------------|------------------|-----------------|-------------------|
| Cable4/0/U0   | down        | 1000           | * * *             | frequency       | not set          |                | * * * 0          | 0               | 0                 |
| Cable4/0/U1   | down        | 1000           | * * *             | frequency       | not set          |                | * * * 0          | 0               | 0                 |
| Cable4/0/U2   | down        | 1000           | * * *             | frequency       | not set          |                | * * * 0          | 0               | 0                 |
| Cable4/0/U3   | down        | 1000           | * * *             | frequency       | not set          |                | * * * 0          | 0               | 0                 |
| Cable4/0/U4   | down        | 1000           | * * *             | frequency       | not set          |                | * * * 0          | 0               | 0                 |
| Cable4/0/U5   | down        | 1000           | * * *             | frequency       | not set          |                | * * * 0          | 0               | 0                 |
| Cable5/0/U0   | down        | 1000           | * * *             | interface       | is down          |                | * * * 0          | 0               | 0                 |
| Cable5/0/U1   | down        | 1000           | * * *             | frequency       | not set          |                | * * * 0          | 0               | 0                 |
| Cable5/0/U2   | down        | 1000           | * * *             | interface       | is down          |                | * * * 0          | 0               | 0                 |
| Cable5/0/U3   | down        | 1000           | * * *             | interface       | is down          |                | * * * 0          | 0               | 0                 |
| Cable5/0/U4   | down        | 1000           | * * *             | interface       | is down          |                | * * * 0          | 0               | 0                 |
| Cable5/0/U5   | down        | 1000           | * * *             | interface       | is down          |                | * * * 0          | 0               | 0                 |
| Cable6/0/U0   | down        | 1000           | * * *             | interface       | is down          |                | * * * 0          | 0               | 0                 |
| Cable6/0/U1   | 22.000 Mhz  | 1000           | * * *             | set to fixed    | frequency        |                | * * * 31375      | 1912            |                   |
| Cable6/0/U2   | 26.000 Mhz  | 1000           | * * *             | set to fixed    | frequency        |                | * * * 0          | 0               |                   |
| Cable6/0/U3   | admindown   | 1000           | * * *             | frequency       | not set          |                | * * * 0          | 0               |                   |

The following example shows typical output from the **show cable hop upstream** command:

```
Router# show cable hop c2/0 upstream 2
```

| Upstream Port | Port Status | Poll Rate (ms) | Missed Poll Count | Min Poll Sample | Missed Poll Pcnt | Hop Thres Pcnt | Hop Period (sec) | Corr FEC Errors | Uncorr FEC Errors |
|---------------|-------------|----------------|-------------------|-----------------|------------------|----------------|------------------|-----------------|-------------------|
| Cable2/0/U2   | admindown   | 1000           | * * *             | frequency       | not set          |                | * * * 0          | 0               | 0                 |

```
Router#
```

Table 69 describes the fields displayed by the **show cable hop** and **show cable hop upstream** commands.

**Table 69** *show cable hop Command Field Descriptions*

| Field             | Description                                                                                                                                                                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Upstream Port     | The upstream port for this information line.                                                                                                                                                     |
| Port Status       | Lists the status of the port. Valid states are down if frequency is unassigned or admin down if the port is shut down. If the port is up, this column shows the center frequency of the channel. |
| Poll Rate         | The rate that station maintenance polls are generated (in milliseconds).                                                                                                                         |
| Missed Poll Count | The number of missing polls, per codeword/FEC block.                                                                                                                                             |

**Table 69** *show cable hop Command Field Descriptions (continued)*

| Field             | Description                                                                                                                                                                                                                                     |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Min Poll Sample   | The number of polls in the sample, per codeword/FEC block.                                                                                                                                                                                      |
| Missed PollPcnt   | The ratio of missing polls to the number of polls, expressed as a percentage.                                                                                                                                                                   |
| Hop Thres Pcnt    | The level that the missed poll percentage must exceed to trigger a frequency hop, expressed as a percentage.                                                                                                                                    |
| Hop Period        | The maximum rate that frequency hopping will occur (in seconds).                                                                                                                                                                                |
| Corr FEC Errors   | The number of correctable forward error corrections (FEC) errors on this upstream port, per codeword/FEC block.                                                                                                                                 |
| Uncorr FEC Errors | The number of uncorrectable FEC errors on this upstream port, per codeword/FEC block.                                                                                                                                                           |
| <b>Note</b>       | The <b>show cable hop</b> and <b>show controllers cable</b> commands display FEC errors per codewords, while the <b>show interface cable upstream</b> command displays FEC errors per packets, where a packet could contain multiple codewords. |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

The following example shows typical output from the **show cable hop threshold** command:

```
Router# show cable hop c6/0/0 threshold
Upstream SNR(dB) CNR(dB) CorrFEC% UncorrFEC% MissedSM%
Port Val Thre1 Thre2 Val Thre1 Thre2 Pcnt Thre Pcnt Thre Pcnt Thre
Ca6/0/0/U0 27 25 15 39 35 25 0 3 0 1 75 75
Ca6/0/0/U1 31 25 15 51 35 25 0 3 0 1 90 75
Ca6/0/0/U2 -- 35 25 -- 35 25 0 3 0 1 0 75
Ca6/0/0/U3 -- 35 25 -- 35 25 0 3 0 1 0 75
```

[Table 70](#) describes the fields displayed by the **show cable hop threshold** command.

**Table 70** *show cable hop threshold Command Field Descriptions*

| Field             | Description                                                                                                     |
|-------------------|-----------------------------------------------------------------------------------------------------------------|
| Upstream Port     | The upstream port for this information line.                                                                    |
| SNR (dB)          | The signal-to-noise ratio (SNR) for a particular cable modem (CM), in decibels (dB).                            |
| CNR (dB)          | The current upstream carrier-to-noise ratio (CNR) for a particular cable modem (CM), in decibels (dB).          |
| Corr FEC Errors   | The number of correctable forward error corrections (FEC) errors on this upstream port, per codeword/FEC block. |
| Uncorr FEC Errors | The number of uncorrectable FEC errors on this upstream port, per codeword/FEC block.                           |
| Missed SM         | The number of missing station maintenance polls, per codeword/FEC block.                                        |

The following example shows typical output from the **show cable hop history** command:

```
Router# show cable hop c8/1/1 upstream 0 history
```

F = Frequency Hop, M = Modulation Change, C = Channel Width Change

```
Upstream Action Chg Chg Action
Port Time Code From To Reason
C8/1/1 U0 Feb 20 12:21:29 M 142 141 SNR 28>=28 CFEC 0<=3 UnCFEC 0<=1
 Feb 20 12:09:08 F 0.000 24.000 Configuration changed
```

Table 71 describes the fields displayed by the **show cable hop history** command.

**Table 71** *show cable hop history Command Field Descriptions*

| Field         | Description                                           |
|---------------|-------------------------------------------------------|
| Upstream Port | The upstream port for this information line.          |
| Action Time   | The time of the spectrum management action.           |
| Code          | The code associated with the type of hop.             |
| Chg From      | The previous state of the spectrum management action. |
| Chg To        | The current state of the spectrum management action.  |
| Action Reason | The reason for changing the frequency.                |

#### Related Commands

| Command                                    | Description                                                                                                                           |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable spectrum-group hop period</b>     | Changes the minimum time between frequency hops.                                                                                      |
| <b>cable spectrum-group hop threshold</b>  | Specifies a frequency hop threshold for a spectrum group.                                                                             |
| <b>cable upstream hop-priority</b>         | Configures the priority of the corrective actions to be taken when a frequency hop is necessary due to ingress noise on the upstream. |
| <b>cable upstream modulation-profile</b>   | Configures up to three modulation profiles to an upstream port to activate Dynamic Upstream Modulation.                               |
| <b>cable upstream threshold</b>            | Configures the upstream for the CNR and FEC threshold values to be used in determining the allowable noise levels.                    |
| <b>cable upstream threshold hysteresis</b> | Configures a hysteresis value to be used in conjunction with the dynamic modulation upgrade thresholds.                               |
| <b>clear cable hop</b>                     | Clears the forward error corrections (FEC) hop counters on one or all cable interfaces on a Cisco CMTS.                               |
| <b>show cable host access-group</b>        | Displays the statistics for the host behind the CM.                                                                                   |
| <b>show cable modem</b>                    | Displays CM configuration settings.                                                                                                   |

# show cable host access-group

To display the hosts and other customer premises equipment (CPE) devices behind the CMs in the network, along with their access groups, use the **show cable host access-group** command in privileged EXEC mode.

**show cable host** [*ip-address* | *mac-address*] **access-group**



## Note

The **show cable host** command is not supported on the Cisco uBR10012 universal broadband router.

## Syntax Description

|                 |                                                                               |
|-----------------|-------------------------------------------------------------------------------|
| <i>mac-addr</i> | (Optional) Specifies the 48-bit hardware address for a particular CM or host. |
| <i>ip-addr</i>  | (Optional) Specifies the IP address for a particular CM or host.              |

## Command Modes

Privileged EXEC

## Command History

| Release     | Modification                                                                                                                                                                                              |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.NA       | This command was introduced.                                                                                                                                                                              |
| 12.1(3a)EC1 | Support was added to the Release 12.1 EC train.                                                                                                                                                           |
| 12.2(4)BC1  | Support was added to the Release 12.2 BC train for the Cisco uBR7100 series and Cisco uBR7200 series routers. (This command also appears in the CLI for the Cisco uBR10012 router but is not functional.) |

## Usage Guidelines

This command displays information only for hosts and other CPE devices. To display information for CMs and their associated CPE devices, use the **show cable device access-group** command. To display information only for CMs, use the **show cable device access-group** command.

If an SNMP manager is requesting information about CM or CPE devices at the same time that this command is given, the command displays the following error message:

No information is available, please try later.

Wait until the SNMP retrieval is done and retry the CLI command.

## Examples

The following example shows how to display all the hosts behind the CMs in the network:

```
router# show cable host access-group
```

| MAC address    | IP address     | Type | Access-group |
|----------------|----------------|------|--------------|
| 0080.c6f9.b42e | 24.168.220.52  | host |              |
| 0020.7806.defe | 192.168.28.134 | host |              |
| 0050.baa0.5ccd | 24.168.223.251 | host |              |
| 0050.046f.f4cf | 192.168.33.25  | host |              |
| 0050.bacf.5d89 | 192.168.37.113 | host |              |
| 0050.1800.a8cb | 192.168.33.90  | host |              |
| 0040.d00f.44f0 | 192.168.34.128 | host |              |
| 0050.e456.9641 | 192.168.39.66  | host |              |

```

0050.badd.2883 192.168.32.230 host
0050.badd.3b12 192.168.33.246 host
0020.78c7.f887 192.168.32.32 host
00e0.2969.a1a5 192.168.36.246 host
0020.78d5.ddf0 192.168.32.107 host
00001.02c5.9936 192.168.38.233 host
0020.78d0.fb32 192.168.28.45 host
0050.1800.f458 192.168.36.209 host
0002.e301.df8f 192.168.30.191 host
00a0.2451.b7eb 24.168.223.41 host
0080.c7db.afba 192.168.33.153 host
00D0.2717.1899 192.168.39.189 host

```

Router#

Table 0-72 describes the fields that are shown in the **show cable host access-group** display:

**Table 0-72 show cable host access-group Field Descriptions**

| Field        | Description                                                                                                                                                                                                                                |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address  | The MAC address for the CPE device.                                                                                                                                                                                                        |
| IP Address   | The IP address that the DHCP server has assigned to the CPE device.                                                                                                                                                                        |
| Type         | Identifies the type of device. With this command, this field should always be host to indicate a CPE device. Use the <b>show cable device access-group</b> or <b>show cable modem access-group</b> command to display information for CMs. |
| Access-group | Displays the access group name or number in use (if any) for this CPE device.                                                                                                                                                              |



**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                               | Description                                                                   |
|---------------------------------------|-------------------------------------------------------------------------------|
| <b>cable device</b>                   | Configures the access list for a CM device or host.                           |
| <b>cable host access-group</b>        | Configures the access list for the specified hosts.                           |
| <b>clear cable host</b>               | Clears the host from the table.                                               |
| <b>show cable device access-group</b> | Displays a list of CMs and their CPE devices, along with their access groups. |
| <b>show cable modem access-group</b>  | Displays the access groups for the CMs on a particular cable interface.       |

# show cable ib-ipc

To display the status of local IB IPC server and information on participating line cards, use the **show cable ib-ipc** command in privileged EXEC mode.

```
show cable ib-ipc {status | ports}
```

|                    |               |                                                   |
|--------------------|---------------|---------------------------------------------------|
| Syntax Description | <b>status</b> | Displays status of local IB IPC server.           |
|                    | <b>ports</b>  | Displays information on participating line cards. |

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |                |                                                            |
|-----------------|----------------|------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                        |
|                 | 12.3(23)BC     | This command was introduced for the Cisco uBR10012 router. |

Examples

The following is sample output from the **show cable ib-ipc** command. The command **show cable ib-ipc ports** displays the internal virtual channel identifiers and internal service flows for Ironbus based IPC.

```
Router# show cable ib-ipc ports
6/0: LCP High Priority VCCI 135, SFID 32891
LCP Normal Priority VCCI 135, SFID 135
8/0: LCP High Priority VCCI 153, SFID 32909
LCP Normal Priority VCCI 153, SFID 153
```

# show cable ipc-stats

To display statistics of all IPC messages on a Cisco CMTS router, use the **show cable ipc-stats** command in privileged EXEC mode.

## show cable ipc-stats

**Syntax Description** This command has no arguments or keywords.

**Command Default** None

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                   |
|-----------------|-------------|------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC.                                  |
|                 | 12.2(33)SCF | The command output displays the IPC port information such as service type of the IPC messages. |

**Usage Guidelines** You must enable the Cable IPC Statistics Collection tool using the **cable ipc-stats** command before using the **show cable ipc-stats** command. When you use this **show** command, a separate shadow database buffer is allocated, and the contents of the active database are copied into the shadow database to display the IPC statistics. This ensures that all the statistics are frozen at the same time for easy comparison and analysis.

**Examples** The following is a sample output of the **show cable ipc-stats** command that shows statistics of all IPC messages on a Cisco CMTS router:

```
Router# show cable ipc-stats
```

```
--- TIME ---
```

```
Start: 05:25:22 UTC Tue May 24 2011
```

```
End : 05:26:39 UTC Tue May 24 2011
```

```
Total: 0 days 00 hrs 01 mins 17 secs (77 seconds)
```

```
size : 2186112 bytes
```

```
--- CMTS MSG ---
```

| entity app | io        | s/s reqid idx dbg : | pkts | bytes lastEvt | totalDur | maxDur       |
|------------|-----------|---------------------|------|---------------|----------|--------------|
| lastMax    |           |                     |      | (sec)         | (msec)   | (msec) (sec) |
| rp-lc c10k | TxReq 1/0 | 10241 1 off :       | 2    | 48            | 58       |              |
| rp-lc c10k | TxReq 1/0 | 10 14 off :         | 15   | 960           | 4        |              |
| rp-lc c10k | TxReq 1/1 | 10 14 off :         | 15   | 960           | 4        |              |
| rp-lc c10k | TxReq 2/1 | 10 14 off :         | 16   | 1024          | 2        |              |
| rp-lc c10k | TxReq 4/1 | 10 14 off :         | 15   | 960           | 4        |              |
| rp-lc c10k | TxReq 5/1 | 10252 2 off :       | 24   | 1840          | 3        |              |
| rp-lc c10k | TxReq 5/1 | 10 14 off :         | 16   | 1024          | 0        |              |

## show cable ipc-stats

```

rp-lc c10k TxReq 7/0 10252 2 off : 17 1112 4
rp-lc c10k TxReq 7/0 10 14 off : 15 960 4
rp-lc c10k TxReq 8/1 10252 2 off : 22 6080 2
rp-lc c10k TxReq 8/1 10 14 off : 15 960 2
rp-lc c10k RxRsp 1/0 10241 1 off : 2 8 58 4 4
58
rp-lc c10k RxRsp 8/1 10252 2 off : 1 72 2 0 0
2
rp-lc c10k RxReq 1/0 10241 1 off : 2 64 58 0 0
58
rp-lc c10k RxReq 1/0 10 14 off : 15 960 4 0 0
4
rp-lc c10k RxReq 1/1 10241 1 off : 38 19684 1 0 0
1
rp-lc c10k RxReq 1/1 10 14 off : 15 960 4 0 0
4
rp-lc c10k RxReq 2/1 10241 1 off : 37 19166 1 0 0
1
rp-lc c10k RxReq 2/1 10 14 off : 16 1024 2 0 0
2
rp-lc c10k RxReq 4/1 10241 1 off : 32 2144 0 0 0
0
rp-lc c10k RxReq 4/1 10 14 off : 15 960 4 0 0
4
rp-lc c10k RxReq 5/1 10252 2 off : 242 733456 2 0 0
2
rp-lc c10k RxReq 5/1 10 14 off : 16 1088 0 0 0
0
rp-lc c10k RxReq 7/0 10252 2 off : 257 783364 1 0 0
1
rp-lc c10k RxReq 7/0 10 14 off : 15 1020 4 0 0
4
rp-lc c10k RxReq 8/1 10252 2 off : 241 714668 4 0 0
4
rp-lc c10k RxReq 8/1 10 14 off : 15 1020 2 0 0
2
rp-lc pnego TxReq 5/1 14 6 off : 1 30 77

entity app io s/s reqid idx dbg : pkts bytes lastEvt totalDur maxDur
lastMax

rp-lc pnego TxReq 7/0 14 6 off : 1 30 77
rp-lc pnego TxReq 8/1 14 6 off : 1 30 77
rp-lc plfm RxReq 5/1 24 17 off : 2 24 12 0 0
12
rp-lc plfm RxReq 5/1 27 20 off : 225 23400 2 36 4
12
rp-lc plfm RxReq 5/1 28 21 off : 9900 554400 2 1584 4
12
rp-lc plfm RxReq 7/0 24 17 off : 1 12 21 0 0
21
rp-lc plfm RxReq 7/0 27 20 off : 240 24960 1 72 4
1
rp-lc plfm RxReq 7/0 28 21 off : 10560 591360 1 3168 4
1
rp-lc plfm RxReq 8/1 24 17 off : 1 12 28 0 0
28
rp-lc plfm RxReq 8/1 27 20 off : 225 23400 4 32 4
4
rp-lc plfm RxReq 8/1 28 21 off : 9900 554400 4 1408 4
4
rp-lc docsis TxReq 5/1 118 109 off : 30 240 3
rp-lc docsis TxReq 7/0 118 109 off : 16 128 4
rp-lc docsis TxReq 8/1 118 109 off : 16 128 3

```



```

rp-lc docsis RxReq 5/1 153 144 off : 345 19320 2 184 4
7
rp-lc docsis RxReq 7/0 153 144 off : 384 21504 1 192 4
66
rp-lc docsis RxReq 8/1 153 144 off : 60 3360 4 80 4
9
rp-lc docsis RxReq 8/1 154 145 off : 15 480 4 20 4
9
rp-lc snmp RxReq 5/1 42 42 off : 2 32 5 4 4
5
rp-lc test TxReq 8/1 10 3 off : 1 16 2
rp-lc test TxReq 8/1 20 13 off : 100 1600 2
rp-lc test RxRsp 8/1 10 3 off : 1 16 2 0 0
2
--- CMTS TXQ ---
TXQ_5_1_default
enQ: 24 pkts max Q size 1 at 3 sec ago
deQ: 24 pkts max delay 0 msec at 3 sec ago
 delay between (0, 10) msec: 24 pkts
 delay between (0, 1) sec : 24 pkts
flush: 0 pkts 0 times

TXQ_7_0_default
enQ: 17 pkts max Q size 1 at 4 sec ago
deQ: 17 pkts max delay 0 msec at 4 sec ago
 delay between (0, 10) msec: 17 pkts
 delay between (0, 1) sec : 17 pkts
flush: 0 pkts 0 times

TXQ_8_1_default
enQ: 17 pkts max Q size 1 at 3 sec ago
deQ: 17 pkts max delay 0 msec at 3 sec ago
 delay between (0, 10) msec: 17 pkts
 delay between (0, 1) sec : 17 pkts
flush: 0 pkts 0 times

TXQ_8_1_inband
enQ: 5 pkts max Q size 5 at 2 sec ago
deQ: 5 pkts max delay 4 msec at 2 sec ago
 delay between (0, 10) msec: 5 pkts
 delay between (0, 1) sec : 5 pkts
flush: 0 pkts 0 times

--- CMTS WATERMARK ---
--- CMTS RXQ ---
CMTS rxq
enQ: 956 pkts max Q size 6 at 41 sec ago
deQ: 956 pkts max delay 4 msec at 69 sec ago
 delay between (0, 10) msec: 956 pkts
 delay between (0, 1) sec : 956 pkts
flush: 0 pkts 0 times

CMTS LP rxq
enQ: 742 pkts max Q size 6 at 41 sec ago
deQ: 742 pkts max delay 8 msec at 64 sec ago
 delay between (0, 10) msec: 742 pkts
 delay between (0, 1) sec : 742 pkts
flush: 0 pkts 0 times

```

**Table 1** describes the fields displayed by the **show cable ipc-stats** command.

**Table 73** *show cable ipc-stats Command Field Descriptions*

| Field           | Description                                                                         |
|-----------------|-------------------------------------------------------------------------------------|
| entity          | Route processor-to-line card connection or a line card-to-line card connection.     |
| app             | Message group.                                                                      |
| io              | Send request or a send response, or a receiver request or a receiver response.      |
| s/s             | Slot/subslot                                                                        |
| reqid           | Nonsequential message ID for the original request.                                  |
| idx             | Sequential message index for the original request.                                  |
| pkts            | Number of messages.                                                                 |
| bytes           | Number of bytes.                                                                    |
| lastEvt (sec)   | Seconds since the last send or receive event.                                       |
| totalDur (msec) | Total time in milliseconds for the blocked send wait or received request process.   |
| maxDur (msec)   | Maximum time in milliseconds for the blocked send wait or received request process. |
| lastMax (sec)   | Seconds since the last maxDur is recorded.                                          |

**Related Commands**

| Command                      | Description                                                                              |
|------------------------------|------------------------------------------------------------------------------------------|
| <b>cable ipc-stats</b>       | Enables the Cable IPC Statistics Collection tool on a Cisco CMTS router.                 |
| <b>clear cable ipc-stats</b> | Clears the active database and resets all IPC statistics in the active database to zero. |

# show cable l2-vpn dot1q-vc-map

To display the mapping of one or all cable modems to IEEE 802.1Q Virtual Local Area Networks (VLANs) on the router's Ethernet interfaces, use the **show cable l2-vpn dot1q-vc-map** command in privileged EXEC mode.

```
show cable l2-vpn dot1q-vc-map [mac-address [vpn vpnid][verbose]] [customer cust-name][vpn
vpnid]
```

|                           |                                  |                                                                                                                                                          |
|---------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>mac-address</i>               | (Optional) Displays the mapping for the cable modem with the specified hardware MAC address.                                                             |
|                           | <b>vpn</b> <i>vpnid</i>          | (Optional) Displays Layer 2 VPN information on a cable modem with the specified MAC address, or for the specified VPN ID across all cable modems.        |
|                           | <b>verbose</b>                   | (Optional) Displays additional information about the Layer 2 mapping, including the number of packets and bytes received on the upstream and downstream. |
|                           | <b>customer</b> <i>cust-name</i> | (Optional) Displays the VLAN mappings for this particular customer name.                                                                                 |

**Defaults** Displays information for all cable modems that have a defined IEEE 802.1Q VLAN mapping.

**Command Modes** Privileged EXEC

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                          |
|------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.2(15)BC2    | This command was introduced for Cisco uBR7246VXR universal broadband routers.                                                                                                                                                                                                                |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA on the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers. Support for the Cisco uBR7225VXR router was added. The <b>vpn</b> keyword was added and the output fields were modified to display L2VPN information. |

**Usage Guidelines** This command displays the cable modem to VLAN mappings that have been defined using the **cable dot1q-vc-map** command. It displays the MAC address, service ID (SID), and cable interface being used by the cable modem, and the interface and VLAN ID to which it has been mapped.



## Tip

The **customer** option displays only those VLAN mappings that have been configured with a particular customer name, using the **cable dot1q-vc-map** command.

The command also displays L2VPN information for cable modem traffic and service flows on CMTS router Ethernet interfaces that have been defined using the **cable l2-vpn-service default-nsi** command.

## Examples

## TLS in Cisco IOS Release 12.2BC Examples

The following example shows typical output for the **show cable l2-vpn dot1q-vc-map** command for all cable modems that are mapped to IEEE 802.1Q VLANs:

```
Router# show cable l2-vpn dot1q-vc-map
```

```
MAC Address Ethernet Interface VLAN ID Cable Intf SID Priv Bits
0010.7bed.9c95 FE0/0.2 3 Cable4/0 3 0
0007.0e03.69f9 FE0/0.1 4 Cable4/0 1 0
```

```
Router#
```

The following example shows typical output for a particular cable modem with the MAC address of 0001.0203.0405:

```
Router# show cable l2-vpn dot1q-vc-map 0001.0203.0405
```

```
MAC Address Ethernet Interface VLAN ID Cable Intf SID Priv Bits
0010.7bed.9c91 GE2/0 5 Cable5/0 7 0
```

```
Router#
```

The following example shows a typical example for the **verbose** option:

```
Router# show cable l2-vpn dot1q-vc-map 0001.0203.0405 verbose
```

```
MAC Address : 0010.7bed.9c91
Prim Sid : 7
Cable Interface : Cable5/0
Ethernet Interface : GigabitEthernet2/0
DOT1Q VLAN ID : 5
Total US pkts : 6
Total US bytes : 1402
Total DS pkts : 71
Total DS bytes : 21975
```

[Table 74](#) describes the fields shown in the display.

**Table 74** *show cable l2-vpn dot1q-vc-map Field Descriptions*

| Field              | Description                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------|
| MAC Address        | Hardware (MAC) address for the CM being mapped.                                                                    |
| Ethernet Interface | Destination interface (Ethernet, Fast Ethernet, or Gigabit Ethernet) for the VLAN being used for the mapping.      |
| VLAN ID            | Destination VLAN on the Ethernet, Fast Ethernet, or Gigabit Ethernet interface for the traffic coming from the CM. |
| Cable Intf         | Cable interface to which the CM is connected.                                                                      |
| SID                | Primary service ID (SID) for this cable modem.                                                                     |

**Table 74** *show cable l2-vpn dot1q-vc-map Field Descriptions (continued)*

| Field               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Priv Bits           | <p>Identifies the current settings of the two privacy bits in the extended header (EH) that is used for BPI-encrypted packets.</p> <ul style="list-style-type: none"> <li>First bit = Enable bit. Set to 1 when BPI or BPI+ is enabled.</li> <li>Second bit = Toggle bit. Matches the least-significant bit (LSB) of the key sequence number (KSN) in the EH.</li> </ul> <p>For example, a value of “0” indicates that BPI is not enabled. A value of “10” indicates that BPI is enabled and that the KSN is an even number. A value of “11” indicates that BPI is enabled and that the KSN is an odd number.</p> <p><b>Note</b> For more information on these bits, see the DOCSIS Baseline Privacy Interface Plus Interface Specification (SP-BPI+-I08-020301 or later).</p> |
| Total US pkts/bytes | Total number of packets and bytes sent on the upstream to the Layer 2 tunnel by this cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Total DS pkts/bytes | Total number of packets and bytes received on the downstream from the Layer 2 tunnel by this cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**L2VPN over Cable in Cisco IOS Release 12.2SB Examples**

The following example shows sample output of VLAN information for all cable modems configured for L2VPN support:

```
Router# show cable l2-vpn dot1q-vc-map
MAC Address Ethernet Interface VLAN ID Cable Intf SID Customer Name/VPN ID
0014.f8c1.fd66 GigabitEthernet4/0/0 68 Cable6/0/0 3 0234560001
```

The following example shows sample output of VLAN information for a VPN with ID 0234560001:

```
Router# show cable l2 dot1q-vc-map vpn 0234560001
MAC Address Ethernet Interface VLAN ID Cable Intf SID Customer Name/VPNID
0014.f8c1.fd66 GigabitEthernet4/0/0 68 Cable6/0/0 3 0234560001
```

The following example shows sample output of VLAN information for a VPN with ID 0234560001 on the cable modem with MAC address 0014.f8c1.fd66:

```
Router# show cable l2-vpn dot1q-vc-map 0014.f8c1.fd66 vpn 0234560001
MAC Address Ethernet Interface VLAN ID Cable Intf SID Customer Name/VPNID
0014.f8c1.fd66 GigabitEthernet4/0/0 68 Cable6/0/0 3 0234560001
```

The following example shows sample output of detailed VLAN information for a VPN with ID 0234560001 on the cable modem with MAC address 0014.f8c1.fd66:

```
Router# show cable l2-vpn dot1q-vc-map 0014.f8c1.fd66 vpn 0234560001 verbose
MAC Address : 0014.f8c1.fd66
Prim Sid : 3
Cable Interface : Cable6/0/0
VPN ID : 0234560001
L2VPN SAID : 12294
Upstream SFID : 23
Downstream CFRID[SFID] : 2[24]
CMIM : 0x60
Ethernet Interface : GigabitEthernet4/0/0
DOT1Q VLAN ID : 68
Total US pkts : 1372
Total US bytes : 500226
Total US pkt Discards : 0
```

**show cable l2-vpn dot1q-vc-map**

```

Total US byte Discards : 0
Total DS pkts : 1248
Total DS bytes : 415584
Total DS pkt Discards : 0
Total DS byte Discards : 0

```

The following example shows sample output of detailed VLAN information for a cable modem with MAC address 0014.f8c1.fd66:

```
Router# show cable l2-vpn dot1q-vc-map 0014.f8c1.fd66 verbose
```

```

MAC Address : 0014.f8c1.fd66
Prim Sid : 3
Cable Interface : Cable6/0/0
L2VPNs provisioned : 1
DUT Control/CMIM : Enable/0xFFFFFFFF

VPN ID : 0234560001
L2VPN SAID : 12294
Upstream SFID : 23
Downstream CFRID[SFID] : 2[24]
CMIM : 0x60
Ethernet Interface : GigabitEthernet4/0/0
DOT1Q VLAN ID : 68
Total US pkts : 1374
Total US bytes : 501012
Total US pkt Discards : 0
Total US byte Discards : 0
Total DS pkts : 1250
Total DS bytes : 416250
Total DS pkt Discards : 0
Total DS byte Discards : 0

```

Table 75 describes the fields shown in the display.

**Table 75** *show cable l2-vpn dot1q-vc-map with L2VPN Field Descriptions*

| Field                   | Description                                                                                                            |
|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| MAC Address             | Hardware (MAC) address for the CM being mapped.                                                                        |
| Prim Sid                | Primary service ID for the CM.                                                                                         |
| Cable Interface         | Cable interface to which the CM is connected.                                                                          |
| L2VPNs provisioned      | Number of L2VPNs supported by the CM.                                                                                  |
| DUT Control/CMIM        | State of Downstream Unencrypted Traffic (DUT) filtering and Cable Modem Interface Mask (CMIM).                         |
| VPN ID                  | Identification number of the Layer 2 VPN tunnel.                                                                       |
| L2VPN SAID              | Layer 2 VPN Security Association Identifier (SAID).                                                                    |
| Upstream SFID           | Upstream Service Flow Identifier (SFID).                                                                               |
| Downstream CFRID [SFID] | Downstream classifiers (classifier identifiers) and corresponding downstream service flows identifiers for this L2VPN. |
| CMIM                    | Cable Modem Interface Mask.                                                                                            |
| Ethernet Interface      | Ethernet Network System Interface (NSI).                                                                               |
| DOT1Q VLAN ID           | Destination VLAN on the Ethernet, Fast Ethernet, or Gigabit Ethernet interface for the traffic coming from the CM.     |

**Table 75** *show cable l2-vpn dot1q-vc-map with L2VPN Field Descriptions (continued)*

| Field                      | Description                                                                                      |
|----------------------------|--------------------------------------------------------------------------------------------------|
| Total US pkts/bytes        | Total number of packets and bytes sent on the upstream to the Layer 2 tunnel by this CM.         |
| Total US pkt/byte Discards | Total number of packets and bytes dropped on the upstream to the Layer 2 tunnel by this CM.      |
| Total DS pkts/bytes        | Total number of packets and bytes received on the downstream from the Layer 2 tunnel by this CM. |
| Total DS pkt/byte Discards | Total number of packets and bytes dropped on the downstream from the Layer 2 tunnel by this CM.  |

**Related Commands**

| Command                                 | Description                                                                                                                                                                                                        |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable l2-vpn-service dot1q</b>       | Enables the use of Layer 2 tunnels for the Customer Premises Equipment (CPE) traffic that is behind cable modems so that individual CPE traffic can be routed over a particular Virtual Local Area Network (VLAN). |
| <b>cable dot1q-vc-map</b>               | Maps a cable modem to a particular VLAN on a local outbound Ethernet interface.                                                                                                                                    |
| <b>cable l2-vpn-service default-nsi</b> | Configures an Ethernet Network System Interface for Layer 2 VPN support over cable.                                                                                                                                |
| <b>debug cable l2-vpn</b>               | Displays debugging messages for the Layer 2 mapping of cable modems to particular PVCs or VLANs.                                                                                                                   |

# show cable l2-vpn vc-map

To display the mapping of one or all cable modems to permanent virtual connections (PVC) on Asynchronous Transfer Mode (ATM) interfaces, use the **show cable l2-vpn vc-map** command in privileged EXEC mode.

```
show cable l2-vpn vc-map [mac-address] [customer cust-name]
```

|                    |                                  |                                                                                        |
|--------------------|----------------------------------|----------------------------------------------------------------------------------------|
| Syntax Description | <i>mac-address</i>               | (Optional) Displays the mapping for the cable modem with the specified hardware (MAC). |
|                    | <b>customer</b> <i>cust-name</i> | (Optional) Displays the PVC mappings for this particular customer name.                |

**Defaults** Displays information for all cable modems that have a defined ATM PVC mapping.

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                                                                                           |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------|
|                 | 12.2(11)BC3 | This command was introduced for Cisco uBR7100 series and Cisco uBR7246VXR universal broadband routers. |
|                 | 12.2(15)BC2 | Support was added for the <b>customer</b> option.                                                      |

**Usage Guidelines** This command displays the cable modem to ATM PVC mappings that have been defined using the **cable vc-map** command. It displays the MAC address, service ID (SID), and cable interface being used by the cable modem, and the ATM interface and PVC/PVI to which it has been mapped.



Tip

The **customer** option displays only those PVC mappings that have been configured with a particular customer name, using the **cable vc-map** command.

**Examples** The following example shows typical output for the **show cable l2-vpn vc-map** command for all cable modems that are mapped to ATM PVCs:

```
Router# show cable l2-vpn vc-map

MAC Address ATM Intf VPI/VCI Cable Intf SID Priv Bits
0010.7bed.9c95 ATM2/0.2 1/2 Cable4/0 3 0
0007.0e03.69f9 ATM2/0.1 1/1 Cable4/0 1 0

Router#
```

The following example shows typical output for a particular cable modem with the MAC address of 0001.0203.0405:

```
Router# show cable l2-vpn vc-map 0001.0203.0405
MAC Address ATM Intf VPI/VCI Cable Intf SID Priv Bits
```



```
0001.0203.0405 ATM3/0.2 1/2 Cable5/0 3 0
```

Router#

Table 0-76 describes the fields shown in the display.

**Table 0-76 show cable l2-vpn vc-map Field Descriptions**

| Field       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address | Hardware (MAC) address for the CM being mapped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ATM Intf    | Destination ATM interface that contains the VPI/VCI being used for the mapping.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| VPI/VCI     | Destination VPI/VCI on the ATM interface for the traffic coming from the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Cable Intf  | Cable interface to which the CM is connected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| SID         | Primary service ID (SID) for this cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Priv Bits   | <p>Identifies the current settings of the two privacy bits in the extended header (EH) that is used for BPI-encrypted packets.</p> <ul style="list-style-type: none"> <li>First bit = Enable bit. Set to 1 when BPI or BPI+ is enabled.</li> <li>Second bit = Toggle bit. Matches the least-significant bit (LSB) of the key sequence number (KSN) in the EH.</li> </ul> <p>For example, a value of “0” indicates that BPI is not enabled. A value of “10” indicates that BPI is enabled and that the KSN is an even number. A value of “11” indicates that BPI is enabled and that the KSN is an odd number.</p> <p><b>Note</b> For more information on these bits, see the DOCSIS Baseline Privacy Interface Plus Interface Specification (SP-BPI+-I08-020301 or later).</p> |

#### Related Commands

| Command                            | Description                                                                                                                                                                                             |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable l2-vpn-service atm-vc</b> | Enables the use of Layer 2 tunnels for the Customer Premises Equipment (CPE) traffic that is behind cable modems, so that individual CPE traffic can be routed to a particular PVC on an ATM interface. |
| <b>cable vc-map</b>                | Maps a cable modem to a particular PVC on an ATM interface.                                                                                                                                             |
| <b>debug cable l2-vpn</b>          | Displays debugging messages for the Layer 2 mapping of cable modems to particular PVC on an ATM interface.                                                                                              |

## show cable l2-vpn xconnect

To display details about the mapping between a Multiprotocol Label Switching (MPLS) pseudowire and its virtual circuits, use the **show cable l2-vpn xconnect** command in privileged EXEC mode.

```
show cable l2-vpn xconnect { dot1q-vc-map | mpls-vc-map } [mac-address | customer
customer-name | state] [verbose]
```

|                           |                                         |                                                                                                                                                    |
|---------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>dot1q-vc-map</b>                     | Specifies the mapping of one or all cable modems to IEEE 802.1Q Virtual Local Area Networks (VLANs) on the Ethernet interfaces of a router.        |
|                           | <b>mpls-vc-map</b>                      | Specifies the mapping between an MPLS pseudowire and its virtual circuits.                                                                         |
|                           | <i>mac-address</i>                      | (Optional) MAC address for a cable modem.                                                                                                          |
|                           | <b>customer</b><br><i>customer-name</i> | (Optional) Specifies the customer name.                                                                                                            |
|                           | <b>state</b>                            | (Optional) Specifies the state of all virtual circuits.                                                                                            |
|                           | <b>verbose</b>                          | (Optional) Specifies verbose mode for the output, giving additional details about the mapping between an MPLS pseudowire and its virtual circuits. |
|                           |                                         |                                                                                                                                                    |

**Command Default** None

**Command Modes** Privileged EXEC (#)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                     |
|------------------------|----------------|-------------------------------------------------------------------------|
|                        | 12.2(33)SCC    | This command was introduced in Cisco IOS Release 12.2(33)SCC.           |
|                        | 12.2(33)SCF    | This command was modified. The <b>verbose</b> keyword option was added. |

### Examples

#### Example of the show cable l2-vpn xconnect Command for the Mapping Between an MPLS Pseudowire and All Virtual Circuits

The following is a sample output of the **show cable l2-vpn xconnect** command that shows the mapping between an MPLS pseudowire and all virtual circuits on a Cisco uBR10012 router:

```
Router# show cable l2-vpn xconnect mpls-vc-map
```

| MAC Address<br>Name/VPNID | Peer IP Address | VCID | CktID      | Cable Intf | SID | Customer   |
|---------------------------|-----------------|------|------------|------------|-----|------------|
| 0000.396e.6a68            | 101.1.0.2       | 221  | Bu254:221  | Cable7/0/0 | 1   | customer1  |
| 0014.f8c1.fd66            | 10.76.1.1       | 2004 | Bu254:5121 | Cable7/0/0 | 8   |            |
| 0019.474a.d566            | 10.76.1.1       | 2001 | Bu254:5122 | Cable7/0/0 | 4   | 0234560002 |
| 0019.474a.d42e            | 10.76.1.1       | 2002 | Bu254:2003 | Cable7/0/0 | 5   | 0234560003 |

**Example of the show cable l2-vpn xconnect Command for a Particular MAC Address**

The following sample output displays the mapping between an MPLS pseudowire and the virtual circuit for a particular MAC address of a cable modem on a Cisco uBR10012 router:

```
Router# show cable l2-vpn xconnect mpls-vc-map 0000.396e.6a68
```

| MAC Address<br>Name/VPNID | Peer IP Address | VCID | CktID     | Cable Intf | SID | Customer  |
|---------------------------|-----------------|------|-----------|------------|-----|-----------|
| 0000.396e.6a68            | 101.1.0.2       | 221  | Bu254:221 | Cable7/0/0 | 1   | customer1 |

**Example of the show cable l2-vpn xconnect Command for a Particular Customer**

The following sample output displays the mapping between an MPLS pseudowire and all virtual circuits configured for a particular customer on a Cisco uBR10012 router:

```
Router# show cable l2-vpn xconnect mpls-vc-map customer1
```

| MAC Address<br>Name/VPNID | Peer IP Address | VCID | CktID     | Cable Intf | SID | Customer  |
|---------------------------|-----------------|------|-----------|------------|-----|-----------|
| 0000.396e.6a68            | 101.1.0.2       | 221  | Bu254:221 | Cable7/0/0 | 1   | customer1 |

**Example of the show cable l2-vpn xconnect Command that Shows Information About the State of All Virtual Circuits**

The following sample output displays the state of all virtual circuits associated with an MPLS pseudowire on a Cisco uBR10012 router:

```
Router# show cable l2-vpn xconnect mpls-vc-map state
```

| Peer IP Address | VCID | STATE | MAC Address    | Customer Name/VPNID | STATE |
|-----------------|------|-------|----------------|---------------------|-------|
| 101.1.0.2       | 22   | DOWN  | 0000.396e.6a68 | customer1           | UP    |
| 10.76.1.1       | 2004 | UP    | 0014.f8c1.fd66 |                     | UP    |
| 10.76.1.1       | 2001 | UP    | 0019.474a.d566 | 0234560002          | UP    |
| 10.76.1.1       | 2002 | UP    | 0019.474a.d42e | 0234560003          | UP    |

**Example of the show cable l2-vpn xconnect Command for the Mapping Between an MPLS Pseudowire and All Virtual Circuits in Cisco IOS Release 12.2(33)SCF**

The following is a sample output of the **show cable l2-vpn xconnect** command that shows the details of the mapping between an MPLS pseudowire and all virtual circuits on a Cisco uBR10012 router:

```
Router# show cable l2-vpn xconnect mpls-vc-map 54d4.6f88.7362 verbose
```

```
Load for five secs: 2%/0%; one minute: 1%; five minutes: 2%
Time source is hardware calendar, *16:46:29.139 pst Thu Mar 3 2011
```

```
MAC Address : 54d4.6f88.7362
Customer Name :
Prim Sid : 18
Cable Interface : Cable5/0/1
MPLS-EXP : 0
PW TYPE : Ethernet
Backup enable delay : 0 seconds
Backup disable delay : 0 seconds

Primary peer
Peer IP Address (Active) : 10.8.8.8
XConnect VCID : 97
Circuit ID : Bu254:97
Local State : UP
```

## ■ show cable l2-vpn xconnect

```

Remote State : UP

Total US pkts : 418756
Total US bytes : 586227332
Total US pkts discards : 0
Total US bytes discards : 0
Total DS pkts : 417347
Total DS bytes : 591773612
Total DS pkts discards : 0
Total DS bytes discards : 0

```

Table 77 describes the fields shown in the **show cable l2-vpn xconnect** command display.

**Table 77** show cable l2-vpn xconnect *Field Descriptions*

| Field                   | Description                                           |
|-------------------------|-------------------------------------------------------|
| MAC Address             | MAC address of a cable modem.                         |
| Peer IP Address         | IP address of the remote provider edge router.        |
| VCID                    | Virtual circuit ID.                                   |
| CktID                   | Circuit ID.                                           |
| Cable Intf/Interface    | Cable interface for the MPLS pseudowire.              |
| SID                     | Service ID.                                           |
| STATE                   | State of all virtual circuits.                        |
| Customer Name           | Customer name.                                        |
| Prim Sid                | Primary service ID.                                   |
| MPLS-EXP                | Multiprotocol Label Switching experimental bit value. |
| PW TYPE                 | Pseudowire type.                                      |
| Backup enable delay     | Interval to enable backup.                            |
| Backup disable delay    | Interval to disable backup.                           |
| Peer IP Adress (Active) | IP address of the active peer router.                 |
| XConnect VCID           | Xconnect virtual circuit ID.                          |
| Circuit ID              | Circuit ID.                                           |
| Local State             | Local state.                                          |
| Remote State            | Remote state.                                         |
| Total US pkts           | Total number of packets sent on the upstream.         |
| Total US bytes          | Total number of bytes sent on the upstream.           |
| Total US pkts discards  | Total number of packets discarded on the upstream.    |
| Total US bytes discards | Total number of bytes discarded on the upstream.      |
| Total DS pkts           | Total number of packets received on the downstream.   |
| Total DS bytes          | Total number of bytes received on the downstream.     |
| Total DS pkts discards  | Total number of packets discarded on the downstream.  |
| Total DS bytes discards | Total number of bytes discarded on the downstream.    |

**Related Commands**

| Command       | Description                                                     |
|---------------|-----------------------------------------------------------------|
| show xconnect | Displays information about attachment circuits and pseudowires. |

# show cable leasequery-filter

To display the number of Dynamic Host Configuration Protocol (DHCP) LEASEQUERY request messages that have been filtered for all cable modems (CMs) or for a particular cable interface, use the **show cable leasequery-filter** command in privileged EXEC mode.

```
show cable leasequery-filter [cable {slot/port | slot/subslot/port}][requests-filtered
[minimum-requests]]
```

|                    |                                       |                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>cable</b> <i>slot/port</i>         | (Optional) Displays information for all CMs on the specified cable interface and downstream port on the Cisco uBR7200 series routers. <ul style="list-style-type: none"><li><i>slot</i>—3 to 6</li><li><i>port</i>—0 or 1 (depending on the cable interface)</li></ul>                                                                                                                                 |
|                    | <b>cable</b> <i>slot/subslot/port</i> | (Optional) Displays information for all CMs on the specified cable interface on the Cisco uBR10012 router. The following are the valid values: <ul style="list-style-type: none"><li><i>slot</i>—5 to 8</li><li><i>subslot</i>—0 or 1</li><li><i>port</i>—0 to 4 (depending on the cable interface)</li></ul>                                                                                          |
|                    | <b>requests-filtered</b>              | (Optional) Displays the number of DHCP LEASEQUERY requests that have been filtered for each particular cable modem on a cable interface. <ul style="list-style-type: none"><li><i>minimum-requests</i>—(Optional) Displays only those cable modems for which the router has filtered at least this minimum number of lease queries. The valid range is from 1 to 65535, with a default of 1.</li></ul> |
|                    |                                       |                                                                                                                                                                                                                                                                                                                                                                                                        |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

| Command History | Release                    | Modification                                                                           |
|-----------------|----------------------------|----------------------------------------------------------------------------------------|
|                 | 12.2(15)BC1d, 12.2(15)BC2b | This command was introduced.                                                           |
|                 | 12.3BC                     | This command was integrated into Cisco IOS Release 12.3BC.                             |
|                 | 12.2(33)SCA                | This command was integrated into Cisco IOS Release 12.2(33)SCA.                        |
|                 | 12.2(33)SCF1               | This command was modified. The command output has been augmented to display IPv6 data. |

**Usage Guidelines** The **show cable leasequery-filter** command displays the total number of DHCP LEASEQUERY requests that have been filtered on a Cisco Cable Modem Termination System (CMTS) router and on a particular cable interface. This command can also optionally display details for each particular cable modem on an interface that has had DHCP lease queries filtered.

**Examples**

The following examples show how to display the total number of DHCP LEASEQUERY requests that have been filtered on the router and on a particular cable interface:

```
Router# show cable leasequery-filter

Lease Query Filter statistics for Unknown Sid
Requests Sent : 138 total. 41 unfiltered, 97 filtered

Router# show cable leasequery-filter cable 8/1/0

Lease Query Filter statistics for Cable8/1/0:
Requests Sent : 35 total. 25 unfiltered, 10 filtered
```

The following examples show how to display the total number of DHCP LEASEQUERY requests that have been filtered on the router and on a particular cable interface in Cisco IOS Release 12.2(33)SCF1:

```
Router# show cable leasequery-filter

IPv4 Lease Query Filter statistics for Unknown Sid
Requests Sent : 0 total. 0 unfiltered, 0 filtered
IPv6 Lease Query Filter statistics for Unknown Sid
Requests Sent : 0 total. 0 unfiltered, 0 filtered

Router# show cable leasequery-filter cable 7/0/0

IPv4 Lease Query Filter statistics for Cable7/0/0:
Requests Sent : 0 total. 0 unfiltered, 0 filtered
IPv6 Lease Query Filter statistics for Cable7/0/0:
Requests Sent : 0 total. 0 unfiltered, 0 filtered
```

The following example shows how to display a list of cable modems on a cable interface and the number of DHCP LEASEQUERY messages that have been filtered for each interface:

```
Router# show cable leasequery-filter cable 8/1/0 requests-filtered

Sid MAC Address IP Address Req-Filtered
1 0050.7366.1243 92.1.1.20 0
2 0007.0e06.953b 95.1.1.24 0
3 0007.0e06.97b5 93.1.1.24 2
4 00d0.ba45.4bd5 91.1.1.35 0
5 0007.0e06.9773 95.1.1.23 12
6 0001.42aa.737d 94.1.1.23 645
7 0001.42aa.738b 95.1.1.22 0
8 00d0.ba45.4955 92.1.1.23 0
9 0007.0e06.51ef 94.1.1.25 0
10 00d0.ba77.743b 91.1.1.36 3
11 0001.42aa.6e6f 93.1.1.22 2
12 0007.0e06.512f 91.1.1.23 2
13 0007.0e06.5137 92.1.1.25 0
14 0007.0e06.9be7 92.1.1.24 0
15 0002.b970.0027 92.1.1.22 1
16 0001.42aa.738d 91.1.1.21 10
```

The following example shows how to display a list of cable modems on a cable interface and the number of DHCP LEASEQUERY messages that have been filtered for each interface in Cisco IOS Release 12.2(33)SCF1:

```
Router# show cable leasequery-filter cable 8/1/0 requests-filtered
```

```
Sid MAC Address IP Address Req-Filtered
1 0018.6835.2756 0.0.0.0 0
2 0025.2e2d.7440 0.0.0.0 0

Sid MAC Address IP Address Req-Filtered
1 0018.6835.2756 2001:DB8:1::1 0
2 0025.2e2d.7440 2001:DB8:1::2 0
```

The following example shows how to display a list of cable modems on a cable interface that have had ten or more DHCP LEASEQUERY messages that have been filtered:

```
Router# show cable leasequery-filter cable 8/1/0 requests-filtered 10
```

```
Sid MAC Address IP Address Req-Filtered
5 0007.0e06.9773 95.1.1.23 12
6 0001.42aa.737d 94.1.1.23 645
16 0001.42aa.738d 91.1.1.21 10
```

[Table 78](#) describes the fields shown in the **show cable leasequery-filter** display.

**Table 78** *show cable leasequery-filter Field Descriptions*

| Field        | Description                                                                                            |
|--------------|--------------------------------------------------------------------------------------------------------|
| Sid          | Service ID (SID) of the device.                                                                        |
| MAC Address  | Hardware (MAC-layer) address of the cable modem or CPE device.                                         |
| IP Address   | IP address of the cable modem (CMs) or customer premises equipment (CPE).                              |
| Req-Filtered | Total number of Address Resolution Protocol (ARP) requests that the device has generated or forwarded. |

#### Related Commands

| Command                                                 | Description                                                                                                                                          |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable arp</b>                                        | Activates the cable ARP.                                                                                                                             |
| <b>cable arp filter</b>                                 | Controls the number of ARP requests and replies that are forwarded on a cable interface.                                                             |
| <b>cable source-verify</b>                              | Enables verification of IP addresses for CMs and CPE devices on the upstream.                                                                        |
| <b>cable source-verify leasequery-filter downstream</b> | Controls the number of DHCP lease query messages that are sent for unknown IP addresses on all cable downstream interfaces on the Cisco CMTS router. |
| <b>cable source-verify leasequery-filter upstream</b>   | Controls the number of DHCP lease query messages that are sent for unknown IP addresses for each SID on an upstream.                                 |



# show cable licenses all

To view license information as applied to RF channels on the CMTS chassis, use the **show cable licenses all** command in the privileged EXEC mode.

## show cable licenses all

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                        |          |
|------------------------|----------|
| <b>Command Default</b> | Disabled |
|------------------------|----------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCE    | This command was introduced. |

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example indicates information about licenses applied to RF channels on the CMTS chassis. |
|-----------------|--------------------------------------------------------------------------------------------------------|

```
Router# show cable licenses all
Load for five secs: 0%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *05:40:06.005 UTC Mon May 3 2010
```

```
Subslot 6/0 : License Configuration : 20X20
Subslot 7/0 : Downstream Licenses : Installed : 72 Consumed : 8 Available : 64
Subslot 7/0 : Upstream Licenses : Installed : 60 Consumed : 52 Available : 8
Subslot 7/1 : Downstream Licenses : Installed : 72 Consumed : 0 Available : 72
Subslot 7/1 : Upstream Licenses : Installed : 60 Consumed : 0 Available : 60
Subslot 8/0 : Downstream Licenses : Installed : 72 Consumed : 8 Available : 64
Subslot 8/0 : Upstream Licenses : Installed : 60 Consumed : 52 Available : 8
Subslot 8/1 : Downstream Licenses : Installed : 0 Consumed : 0 Available : 0
Subslot 8/1 : Upstream Licenses : Installed : 0 Consumed : 0 Available : 0
Router#
```

The following example indicates information about licenses that are loaded on the slot/subslot.

```
Router# show cable licenses 8/0
Load for five secs: 1%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *05:59:18.633 UTC Mon May 3 2010
```

```
Subslot 8/0 : Downstream Licenses : Installed : 72 Consumed : 8 Available : 64
Subslot 8/0 : Upstream Licenses : Installed : 60 Consumed : 52 Available : 8
Router#
```

 show cable licenses all

| Related Commands | Command                       | Description                                                                                             |
|------------------|-------------------------------|---------------------------------------------------------------------------------------------------------|
|                  | show license call-home pak    | Displays the stock keeping unit (SKU) list and features available in a product authorization key (PAK). |
|                  | license call-home install pak | Installs a license by using the Cisco License Call Home feature.                                        |

# show cable load-balance

To display real-time configuration, statistical and operational information for load balancing operations on the router, use the **show cable load-balance** command in privileged EXEC mode.

**show cable load-balance** [[group *n*] | [all | load | pending | statistics | target | fiber-node-validation | vdoc]]

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>group</b> <i>n</i>        | (Optional) Specifies the number of the load balancing group to be displayed.<br>In Cisco IOS Release 12.2(33)SCE3 and earlier, the valid range is from 1 to 336. The range from 1 to 80 is reserved for legacy load balancing groups (LBG). The range from 81 to 336 is reserved for DOCSIS LBGs.<br>In Cisco IOS Release 12.2(33)SCE4 and later, the valid range is from 1 to 256. This range is reserved for legacy LBGs only. |
| <b>all</b>                   | (Optional) Displays all information about the LBG.                                                                                                                                                                                                                                                                                                                                                                               |
| <b>load</b>                  | (Optional) Displays the current interface load and load balancing group assignments.                                                                                                                                                                                                                                                                                                                                             |
| <b>pending</b>               | (Optional) Displays the list of cable modems that are moved from one downstream or upstream to another.                                                                                                                                                                                                                                                                                                                          |
| <b>statistics</b>            | (Optional) Displays cumulative statistics for load balancing operations.                                                                                                                                                                                                                                                                                                                                                         |
| <b>target</b>                | (Optional) Displays the current and target interfaces (upstreams and downstreams) used for load balancing.                                                                                                                                                                                                                                                                                                                       |
| <b>fiber-node-validation</b> | (Optional) Displays DOCSIS LBG and channel information after checking if the channel configuration in load balancing fits in the fiber node configuration.                                                                                                                                                                                                                                                                       |
| <b>vdoc</b>                  | (Optional) Displays information about all LBGs that have the rule "video-over-DOCSIS (vdoc)-enabled" configured.                                                                                                                                                                                                                                                                                                                 |

| Defaults |                                                                                                                                                                                                                                                     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | Displays information for all load balancing groups for each cable interface and its current load and load balancing status. Starting with Cisco IOS Release 12.2(33)SCE4, the <b>show cable load-balance</b> command supports only the legacy LBGs. |

| Command Modes |                 |
|---------------|-----------------|
|               | Privileged EXEC |

| Command History | Release      | Modification                                                                                    |
|-----------------|--------------|-------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC1  | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers.                |
|                 | 12.2(33)SCC  | This command was modified. The <b>fiber-node-validation</b> parameter was added to the command. |
|                 | 12.2(33)SCF  | This command was modified. The <b>vdoc</b> keyword was added to the command.                    |
|                 | 12.2(33)SCE4 | The valid range for the load balance group was changed.                                         |

| Release      | Modification                                                             |
|--------------|--------------------------------------------------------------------------|
| 12.2(33)SCG  | A new column in the output displays the group index for the legacy LBG.  |
| 12.2(33)SCH1 | The output of this command (when used without any keyword) was modified. |

**Usage Guidelines**

Use the **show cable load-balance** command to display the current, real-time statistics for load balancing operations.

Use this command to display the status of the **cable load-balance docsis30-enable downstream-only** command.

**Examples**

The following is a sample output from the **show cable load-balance** command:

```
Router# show cable load-balance
```

| Group | Interval | Method        | DCC Init<br>Technique | Threshold<br>Minimum | Static | Enforce | Ugs | PCMM |
|-------|----------|---------------|-----------------------|----------------------|--------|---------|-----|------|
| 1     | 10       | service-flows | 1                     | 1                    | 2%     | 2%      | --- | ---  |
| 2     | 10       | modems        | 0                     | 5                    | 10%    | ---     | --- | ---  |

DOCSIS LB Enabled: No

Effective with Cisco IOS Release 12.2(33)SCG, a new column in the output for the **show cable load-balance** command also displays the group index for the legacy LBG. The Group Index column identifies the mapping between the legacy LBG ID and the internal group index of the legacy LBG.

```
Router# show cable load-balance
```

| Legacy<br>Group | Group<br>Index | Interval | Method | DCC Init<br>Technique | Threshold<br>Minimum | Static | Enforce | Ugs | PCMM |
|-----------------|----------------|----------|--------|-----------------------|----------------------|--------|---------|-----|------|
| 1               | 513            | 30       | modems | 0                     | 5                    | 10%    | ---     | --- | ---  |
| 2               | 514            | 30       | modems | 0                     | 5                    | 10%    | ---     | --- | ---  |

DOCSIS 2.0 LB Enabled: Yes DOCSIS 3.0 LB Enabled: No

| DOCSIS<br>Group | Group<br>Index | Status | Interval | DCC mask<br>/UCC | Policy | Method<br>DS/US | Threshold<br>M/E/U/P/S |
|-----------------|----------------|--------|----------|------------------|--------|-----------------|------------------------|
| 2               | 1              | GE     | 30       | 0xF8(0)/N 0      |        | m/m             | 5/10/70/70/50          |
| 70              | 2              | RE     | 30       | 0xF8(0)/N 0      |        | m/m             | 1/1/70/70/50           |

Effective with Cisco IOS Release 12.2(33)SCH1, the output of the **show cable load-balance** command was modified. This example shows the modified output:

```
Router#show cable load-balance
```

Load for five secs: 0%/0%; one minute: 0%; five minutes: 0%

Time source is NTP, 20:22:33.307 UTC Wed Jul 17 2013

| Legacy<br>Group | Group<br>Index | Interval | Method | DCC Init<br>Technique | Threshold<br>Minimum | Static | Enforce | Ugs |
|-----------------|----------------|----------|--------|-----------------------|----------------------|--------|---------|-----|
| 1               | 513            | 30       | modems | 0                     | 5                    | 10%    | ---     | --- |

DOCSIS 2.0 LB Enabled: Yes DOCSIS 3.0 LB Downstream Enabled: Yes DOCSIS 3.0 LB Upstream Enabled: No

| DOCSIS<br>Group | Group<br>Index | Status | Interval | DCC mask<br>/UCC | Policy | Method<br>DS/US | Threshold<br>M/E/U/P/S |
|-----------------|----------------|--------|----------|------------------|--------|-----------------|------------------------|
| 1               | 1              | GE     | 30       | 0xF8(0)/N 5      |        | m/m             | 5/10/70/70/50          |
| 2               | 2              | RE     | 30       | 0x40(1)/N 1      |        | m/m             | 2/2/70/70/50           |

```

DOCSIS 3.0 General LB
MD FN Group S Intv DCC mask Policy Mtd MD-CM-SG Threshold
 Index /UCC D/U M/E/U/P/S
Ca5/0/0 1 32768 E 30 0xF8(0)/N 0 m/m 0x101 5/10/70/70/50

Router#

```

The following is a sample output from the **all** option of the **show cable load-balance** command. The **all** option displays information of all options available for this command except the **fiber-node-validation** option.

```
Router# show cable load-balance all
```

| Group | Interval | Method        | DCC Init<br>Technique | Threshold<br>Minimum | Static | Enforce | Ugs | PCMM |
|-------|----------|---------------|-----------------------|----------------------|--------|---------|-----|------|
| 1     | 10       | service-flows | 1                     | 1                    | 2%     | 2%      | --- | ---  |
| 2     | 10       | modems        | 0                     | 5                    | 10%    | ---     | --- | ---  |

```
DOCSIS LB Enabled: No
```

```
Current load:
```

| Interface            | State | Group<br>Index | Utilization | Reserved | Modems | Flows | Weight |
|----------------------|-------|----------------|-------------|----------|--------|-------|--------|
| Cable5/0/3 (459 MHz) | up    | 1              | 0%(0%/0%)   | 0%       | 7      | 7     | 37     |
| Cable5/0/3/U0        | up    | 1              | 0%          | 0%       | 2      | 2     | 1.2    |
| Cable5/0/3/U1        | up    | 1              | 0%          | 0%       | 3      | 3     | 1.2    |
| Cable5/0/3/U2        | up    | 1              | 0%          | 0%       | 1      | 1     | 1.2    |
| Cable5/0/3/U3        | up    | 1              | 0%          | 0%       | 1      | 1     | 1.2    |
| Cable5/0/4 (465 MHz) | up    | 1              | 0%(0%/0%)   | 0%       | 7      | 7     | 37     |
| Cable5/0/4/U0        | up    | 1              | 0%          | 0%       | 2      | 2     | 1.2    |
| Cable5/0/4/U1        | up    | 1              | 0%          | 0%       | 2      | 2     | 1.2    |
| Cable5/0/4/U2        | up    | 1              | 0%          | 0%       | 1      | 1     | 1.2    |
| Cable5/0/4/U3        | up    | 1              | 0%          | 0%       | 2      | 2     | 1.2    |
| Mo1/0/0:0 (555 MHz)  | down  | 1              | 0%(0%/0%)   | 0%       | 0      | 0     | 0      |

```
Target assignments:
```

| Interface            | State | Group<br>Index | Target                         |
|----------------------|-------|----------------|--------------------------------|
| Cable5/0/3 (459 MHz) | up    | 1              | Cable5/0/4 (465 MHz) [enforce] |
| Cable5/0/3/U0        | up    | 1              | Cable5/0/3/U2                  |
| Cable5/0/3/U1        | up    | 1              | Cable5/0/3/U2 [enforce]        |
| Cable5/0/3/U2        | up    | 1              |                                |
| Cable5/0/3/U3        | up    | 1              |                                |
| Cable5/0/4 (465 MHz) | up    | 1              |                                |
| Cable5/0/4/U0        | up    | 1              | Cable5/0/4/U2                  |
| Cable5/0/4/U1        | up    | 1              | Cable5/0/4/U2 [enforce]        |
| Cable5/0/4/U2        | up    | 1              |                                |
| Cable5/0/4/U3        | up    | 1              | Cable5/0/4/U2                  |
| Mo1/0/0:0 (555 MHz)  | down  | 1              |                                |

```
Statistics:
```

| Target interface     | State | Transfers |         |         |          |
|----------------------|-------|-----------|---------|---------|----------|
|                      |       | Complete  | Pending | Retries | Failures |
| Cable5/0/3 (459 MHz) | up    | 3         | 1       | 0       | 0        |
| Cable5/0/3/U0        | up    | 0         | 0       | 0       | 0        |
| Cable5/0/3/U1        | up    | 0         | 0       | 0       | 0        |
| Cable5/0/3/U2        | up    | 0         | 0       | 0       | 0        |
| Cable5/0/3/U3        | up    | 0         | 0       | 0       | 0        |
| Cable5/0/4 (465 MHz) | up    | 0         | 0       | 0       | 0        |
| Cable5/0/4/U0        | up    | 0         | 0       | 0       | 0        |

## ■ show cable load-balance

```

Cable5/0/4/U1 up 0 1 0 0
Cable5/0/4/U2 up 0 0 0 0
Cable5/0/4/U3 up 0 0 0 0
Mo1/0/0:0 (555 MHz) down 0 0 0 0

```

Pending:

```

Modem Grp Idx Source interface Target interface Retries
001a.c30c.7e74 1 Cable5/0/4 Cable5/0/3 (459 MHz) 0
0000.ca45.9886 1 Cable5/0/4/U2 U1 0

```

Router#

Starting with Cisco IOS Release 12.2(33)SCG, a new column in the output for the **show cable load-balance all** command also displays the group index for the legacy LBG.

The following is a sample output from the **all** option of the **show cable load-balance** command:

Router# **show cable load-balance all**

| Legacy Group | Group Index | Interval | Method | DCC Init Technique | Threshold Minimum | Static | Enforce | Ugs | PCMM |
|--------------|-------------|----------|--------|--------------------|-------------------|--------|---------|-----|------|
| 1            | 513         | 30       | modems | 0                  | 5                 | 10%    | ---     | --- | ---  |
| 2            | 514         | 30       | modems | 0                  | 5                 | 10%    | ---     | --- | ---  |

DOCSIS 2.0 LB Enabled: Yes DOCSIS 3.0 LB Enabled: No

| DOCSIS Group | Group Index | Status | Interval | DCC mask /UCC | Policy | Method DS/US | Threshold M/E/U/P/S |
|--------------|-------------|--------|----------|---------------|--------|--------------|---------------------|
| 2            | 1           | GE     | 30       | 0xF8(0)/N 0   |        | m/m          | 5/10/70/70/50       |
| 70           | 2           | RE     | 30       | 0xF8(0)/N 0   |        | m/m          | 1/1/70/70/50        |

Current load:

DOCSIS load-balancing load

| Interface           | State | Group Index | Utilization | Rsvd | NBCM Total | WB/UB Total | Flows | Weight |
|---------------------|-------|-------------|-------------|------|------------|-------------|-------|--------|
| In7/0/0:0 (573 MHz) | up    | 2           | 0%(0%/0%)   | 0%   | 9          | 1           | 41    | 37     |
| In7/0/0:0/U0        | up    | 2           | 0%          | 0%   | 1          | 0           | 1     | 2.5    |
| In7/0/0:0/U1        | up    | 2           | 0%          | 0%   | 2          | 0           | 10    | 2.5    |
| In7/0/0:0/U2        | up    | 2           | 0%          | 0%   | 2          | 0           | 10    | 2.5    |
| In7/0/0:0/U3        | up    | 2           | 0%          | 0%   | 2          | 0           | 10    | 2.5    |
| In7/0/0:0/U4        | up    | 2           | 0%          | 0%   | 2          | 0           | 10    | 2.5    |
| In7/0/0:0/U5        | up    | 2           | 0%          | 0%   | 2          | 0           | 6     | 2.5    |
| In7/0/0:1 (579 MHz) | down  | 2           | 0%(0%/0%)   | 0%   | 0          |             | 0     | 0      |
| In7/0/0:2 (585 MHz) | up    | 2           | 0%(0%/0%)   | 0%   | 1          | 0           | 1     | 37     |
| In7/0/0:2/U0        | up    | 2           | 0%          | 0%   | 1          | 0           | 1     | 2.5    |
| In7/0/0:2/U1        | up    | 2           | 0%          | 0%   | 2          | 0           | 10    | 2.5    |
| In7/0/0:2/U2        | up    | 2           | 0%          | 0%   | 2          | 0           | 10    | 2.5    |
| In7/0/0:2/U3        | up    | 2           | 0%          | 0%   | 2          | 0           | 10    | 2.5    |
| In7/0/0:2/U4        | up    | 2           | 0%          | 0%   | 2          | 0           | 10    | 2.5    |
| In7/0/0:2/U5        | up    | 2           | 0%          | 0%   | 2          | 0           | 6     | 2.5    |
| In7/0/0:3 (591 MHz) | down  | 2           | 0%(0%/0%)   | 0%   | 0          |             | 0     | 0      |

LEGACY load-balancing load

| Interface          | State | Group Index | Utilization | Rsvd | Modem Total | Flows | Weight |
|--------------------|-------|-------------|-------------|------|-------------|-------|--------|
| Cable7/1/0 (0 MHz) | down  | 513         | 0%(0%/0%)   | 0%   | 0           | 0     | 0      |
| Cable7/1/0/U0      | down  | 513         | 0%          | 0%   | 0           | 0     | 0.0    |
| Cable7/1/0/U1      | down  | 513         | 0%          | 0%   | 0           | 0     | 0.0    |
| Cable7/1/0/U2      | down  | 513         | 0%          | 0%   | 0           | 0     | 0.0    |

|                    |      |     |            |    |   |   |     |
|--------------------|------|-----|------------|----|---|---|-----|
| Cable7/1/0/U3      | down | 513 | 0%         | 0% | 0 | 0 | 0.0 |
| Cable7/1/1 (0 MHz) | down | 514 | 0% (0%/0%) | 0% | 0 | 0 | 0   |
| Cable7/1/1/U0      | down | 514 | 0%         | 0% | 0 | 0 | 0.0 |
| Cable7/1/1/U1      | down | 514 | 0%         | 0% | 0 | 0 | 0.0 |
| Cable7/1/1/U2      | down | 514 | 0%         | 0% | 0 | 0 | 0.0 |
| Cable7/1/1/U3      | down | 514 | 0%         | 0% | 0 | 0 | 0.0 |

Target assignments:

| Interface           | State | Group<br>Index | Target                        |
|---------------------|-------|----------------|-------------------------------|
| In7/0/0:0 (573 MHz) | up    | 2              | In7/0/0:2 (585 MHz) [enforce] |
| In7/0/0:0/U0        | up    | 2              |                               |
| In7/0/0:0/U1        | up    | 2              | In7/0/0:0/U0                  |
| In7/0/0:0/U2        | up    | 2              | In7/0/0:0/U0                  |
| In7/0/0:0/U3        | up    | 2              | In7/0/0:0/U0                  |
| In7/0/0:0/U4        | up    | 2              | In7/0/0:0/U0                  |
| In7/0/0:0/U5        | up    | 2              | In7/0/0:0/U0                  |
| In7/0/0:1 (579 MHz) | down  | 2              |                               |
| In7/0/0:2 (585 MHz) | up    | 2              |                               |
| In7/0/0:2/U0        | up    | 2              |                               |
| In7/0/0:2/U1        | up    | 2              | In7/0/0:2/U0                  |
| In7/0/0:2/U2        | up    | 2              | In7/0/0:2/U0                  |
| In7/0/0:2/U3        | up    | 2              | In7/0/0:2/U0                  |
| In7/0/0:2/U4        | up    | 2              | In7/0/0:2/U0                  |
| In7/0/0:2/U5        | up    | 2              | In7/0/0:2/U0                  |
| In7/0/0:3 (591 MHz) | down  | 2              |                               |
| Cable7/1/0 (0 MHz)  | down  | 513            |                               |
| Cable7/1/0/U0       | down  | 513            |                               |
| Cable7/1/0/U1       | down  | 513            |                               |
| Cable7/1/0/U2       | down  | 513            |                               |
| Cable7/1/0/U3       | down  | 513            |                               |
| Cable7/1/1 (0 MHz)  | down  | 514            |                               |
| Cable7/1/1/U0       | down  | 514            |                               |
| Cable7/1/1/U1       | down  | 514            |                               |
| Cable7/1/1/U2       | down  | 514            |                               |
| Cable7/1/1/U3       | down  | 514            |                               |

Statistics:

| Target interface    | State | Transfers |         |         |          |
|---------------------|-------|-----------|---------|---------|----------|
|                     |       | Complete  | Pending | Retries | Failures |
| In7/0/0:0 (573 MHz) | up    | 1         | 0       | 0       | 0        |
| In7/0/0:0/U0        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:0/U1        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:0/U2        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:0/U3        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:0/U4        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:0/U5        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:1 (579 MHz) | down  | 0         | 0       | 0       | 0        |
| In7/0/0:2 (585 MHz) | up    | 14        | 1       | 0       | 0        |
| In7/0/0:2/U0        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:2/U1        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:2/U2        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:2/U3        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:2/U4        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:2/U5        | up    | 0         | 0       | 0       | 0        |
| In7/0/0:3 (591 MHz) | down  | 0         | 0       | 0       | 0        |
| Cable7/1/0 (0 MHz)  | down  | 0         | 0       | 0       | 0        |
| Cable7/1/0/U0       | down  | 0         | 0       | 0       | 0        |
| Cable7/1/0/U1       | down  | 0         | 0       | 0       | 0        |
| Cable7/1/0/U2       | down  | 0         | 0       | 0       | 0        |
| Cable7/1/0/U3       | down  | 0         | 0       | 0       | 0        |
| Cable7/1/1 (0 MHz)  | down  | 0         | 0       | 0       | 0        |

## ■ show cable load-balance

```

Cable7/1/1/U0 down 0 0 0 0
Cable7/1/1/U1 down 0 0 0 0
Cable7/1/1/U2 down 0 0 0 0
Cable7/1/1/U3 down 0 0 0 0

```

Pending:

```

Modem Grp Idx Primary RF/RCC MD/TCS Action Active Retries
 Src Target Src Target Time
54d4.6f88.659c 2 In7/0/0:0 In7/0/0:2 (585 MHz)

```

The following is a sample output from the **fiber-node-validation** option of the **show cable load-balance** command:

```
Router# show cable load-balance fiber-node-validation
```

```

DOCSIS LBG ID Match Channel Fiber-node list
1 match Ca5/0/0/U0 {1}
 match Ca5/0/0/U1 {1}
 match Ca5/0/0/U2 {1}
 match Ca5/0/0/U3 {1}
 match Mo1/0/0:0 {1}
2 match Ca5/0/0/U0 {1}
 match Ca5/0/0/U1 {1}
 match Ca5/0/0/U2 {1}
 match Mo1/0/0:0 {1}

```

Table 79 describes the fields shown in the **show cable load-balance** command displays.

**Table 79** show cable load-balance Field Descriptions (default display)

| Field                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fields for the Default Displays and load Option</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Group Index                                            | Identifies the mapping between the legacy LBG ID and the internal group index of the legacy LBG.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Interface                                              | Cable interface (downstream or upstream) that belongs to a load balancing group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Group                                                  | Number of the load balancing group to which the cable interface has been assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Utilization                                            | <p>This field is a long-term average of the upstream utilization and displays current load usage of the cable interface expressed as a percentage of the total bandwidth. For upstreams, this field shows a single percentage value, which is the average percentage of bandwidth being used on the upstream.</p> <p>For downstreams, this field shows a set of three percentage values:</p> <ul style="list-style-type: none"> <li>• The percentage shows the load usage for the entire interface.</li> <li>• The first percentage, within the parentheses, shows the load for the downstream.</li> <li>• The second percentage, within the parentheses, shows the average load for all upstreams on the downstream.</li> </ul> <p>For example, if this field shows 18%(18%/12%), it indicates that downstream and upstream channels on the interface are running on an average load of 18 percent. The downstream is running on an average load of 18 percent and all upstreams for this downstream are running on an average load of 12 percent.</p> <p><b>Note</b> To view the short-term average of the utilization, use the <b>show interface cable mac-scheduler</b> command.</p> |



**Table 79** *show cable load-balance Field Descriptions (default display) (continued)*

| Field                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| State                                                          | <p>Current state of the cable interface.</p> <p>The following states indicate normal operational states, depending on the configuration:</p> <ul style="list-style-type: none"> <li>• down—Interface is shut down. The CMTS cannot use the interface for load balancing in this state.</li> <li>• initial—Interface is currently in the initialization phase. The CMTS uses the interface for load balancing after the initialization completes.</li> <li>• up—Interface is up and passing traffic. The CMTS actively uses the interface for load balancing.</li> <li>• testing—Interface is currently under a load balancing test. The CMTS is unable to use the interface for normal load balancing operations until the test completes.</li> </ul> <p>The following states indicate abnormal states. The CMTS does not use interfaces in these states for load balancing operations, but continues to monitor and update the status every time the CMTS polls the interfaces for their current load usage:</p> <ul style="list-style-type: none"> <li>• suspicious—Interface is in an unknown state. The interface might be up and passing traffic, but is not consistent enough to support load balancing operations. The CMTS attempts to reinitialize the interface after a timeout period. If the interface has failed initialization more than 10 times, the CMTS moves the interface to the disabled state.</li> <li>• disabled—Interface has been disabled because a load balancing test is in-progress or because the interface reinitialization failed after 10 attempts.</li> <li>• unstable—Interface has failed repeated initialization attempts. The CMTS will attempt to reinitialize the interface after a timeout period. If a load balance test is not in-progress and if reinitialization fails, the CMTS moves it to the unstable state.</li> </ul> |
| Reserved                                                       | Percentage of bandwidth that is currently reserved by unsolicited grant service (UGS) service flows.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Modems                                                         | Number of cable modems currently online on this cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Flows                                                          | Number of service flows currently active on the cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Weight                                                         | Interface bandwidth, in megabits per second (mbps), for the downstream or upstream. The system uses this value in calculating whether the loads on the interfaces are balanced. Changing a channel parameter, such as modulation profile or channel width, affects the channel bandwidth and weight value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Additional Fields When Displaying Load Balancing Groups</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Interval                                                       | Indicates in seconds, the current load on each cable interface in the LBG as configured using the <b>cable load-balance group interval</b> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Method                                                         | Load balancing method used for the LBG as configured using the <b>cable load-balance group (global configuration)</b> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 79** *show cable load-balance Field Descriptions (default display) (continued)*

| Field                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Threshold                                      | <p>Thresholds configured for this load balancing group:</p> <ul style="list-style-type: none"> <li>• <b>M = Minimum</b><br/>Minimum difference in the number of cable modems or service flows that can exist on two interfaces in the group before cable modems are moved between the interfaces. If the imbalance between interfaces is below this value, cable modems are not moved. This field contains a value only when the group is configured for the modems or service flows method of load balancing. (This value is configured using the <b>load minimum</b> option of the <b>cable load-balance group threshold</b> command.)</li> <li>• <b>S = Static</b><br/>Minimum difference in the percentage of total load that must exist between interfaces in a load balancing group before the Cisco CMTS performs static load balancing. When the load between interfaces is greater than this value, cable modems that are in the process of registering with the CMTS are moved between interfaces until the load difference is again below this value. (This value is configured using the <b>load</b> option of the <b>cable load-balance group threshold</b> command.)</li> <li>• <b>E = Enforce</b><br/>Minimum difference in the percentage of total load that must exist between interfaces in a load balancing group before the Cisco CMTS performs dynamic load balancing and begins moving cable modems that are currently online. When the difference in load between two interfaces falls below this value, the CMTS stops dynamic load balancing and performs static load balancing. (This value is configured using the <b>enforce</b> option of the <b>cable load-balance group threshold</b> command.)</li> <li>• <b>U = Ugs</b><br/>Percentage of the bandwidth that is allocated for Unsolicited Grant Services (UGS) traffic, such as Voice-over-IP (VoIP), that is in use on an interface because the CMTS moves cable modems that are online with active UGS service flows. (This value is configured using the <b>ugs</b> option of the <b>cable load-balance group threshold</b> command.)</li> <li>• <b>P = PacketCable MultiMedia (PCMM)</b><br/>Percentage of the reserved bandwidth threshold. Above this level, cable modems with active PCMM service flows participate in load balancing. The default threshold is 70%.</li> </ul> |
| <b>Additional Fields for the target Option</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Interface                                      | Source downstream or upstream interface that is part of a cable load balancing group. If the Target field contains a value, it indicates that the source interface is currently oversubscribed. To reduce the cable load, the CMTS moves cable modems from the source interface to the target interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**Table 79** *show cable load-balance Field Descriptions (default display) (continued)*

| Field                                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Target                                                        | <p>Downstream or upstream interface to which cable modems on the source interface are being moved as part of load balancing operations. This field indicates the following:</p> <ul style="list-style-type: none"> <li>• If it is a downstream interface, the display shows the center frequency of the downstream within parentheses.</li> <li>• If only a frequency is shown, it indicates that the CMTS is moving cable modems to a different center frequency on the same downstream interface.</li> <li>• When the display includes the words “enforce”, it indicates that the CMTS is performing dynamic load balancing on the interfaces.</li> <li>• If this field is blank, it indicates that the source interface is not oversubscribed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Additional Fields for the statistics Option</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Target interface                                              | Downstream or upstream interface. If this is a downstream interface, the display shows the center frequency of the downstream within parentheses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Transfers                                                     | <p>The following information is tracked for the indicated target interface:</p> <ul style="list-style-type: none"> <li>• complete—Number of cable modems successfully moved to the target interface.</li> <li>• pending—Number of cable modems in the process of being moved to the target interface.</li> <li>• retries—Number of times that the CMTS unsuccessfully tried to move the same cable modem to the target interface. This occurs when one or more MAC layer messages to the cable modem are dropped due to radio frequency (RF) noise or because the modem is not DOCSIS-compliant. If the number of retries exceeds five for a particular cable modem, the CMTS counts this as a failure.</li> <li>• failures—Number of times that the CMTS exceeded the maximum number of allowable retries (5) when trying to move a particular cable modem to the target interface. A large number of failures could indicate one or more possible problems: <ul style="list-style-type: none"> <li>– The specific cable modems are not DOCSIS-compliant.</li> <li>– One or both interfaces are having problems passing traffic.</li> <li>– One or both interfaces are having persistent RF noise problems.</li> <li>– The source and target interfaces are not combined in the same node and do not share the same physical connectivity (which is required when interfaces are part the same load balancing group).</li> </ul> </li> </ul> |
| <b>Additional Fields for the pending Option</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Modem                                                         | Hardware (MAC) address of the cable modem that is moved as part of load balancing operations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Source interface                                              | Downstream or upstream cable interface on which the cable modem is currently online.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Target interface                                              | Downstream or upstream cable interface to which the CMTS is trying to move the cable modem to load balance the interfaces in this load balancing group. If the CMTS is moving the cable modem to a different frequency on the same downstream interface, this field shows only the new center frequency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Retries                                                       | Number of times that the CMTS has attempted to move this cable modem to the target interface. The CMTS attempts to move the cable modem 5 times before counting this load balancing move as a failure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Additional Fields for the fiber-node-validation Option</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Table 79** show cable load-balance Field Descriptions (default display) (continued)

| Field           | Description                                                                |
|-----------------|----------------------------------------------------------------------------|
| DOCSIS LBG ID   | The DOCSIS LBG ID.                                                         |
| Channel         | The upstream or downstream channel that is associated with the DOCSIS LBG. |
| Fiber-node list | The list of all fiber nodes that include the channel.                      |

The following is a sample output from the **vdoc** keyword of the **show cable load-balance** command:

Router# **show cable load-balance vdoc**

| Target interface     | State | Group | Util | Total    | IGMP | CIR  | High | Low |
|----------------------|-------|-------|------|----------|------|------|------|-----|
|                      |       | Index |      | Targeted | Rep  | Init | Util | CIR |
| Cable7/0/0 (531 MHz) | down  | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |
| Mo3/0/0:0 (453 MHz)  | up    | 81    | 0    | 9(5)     | 7(5) | 2(0) | 0    | 0   |
| Mo3/0/0:1 (459 MHz)  | initi | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |
| Mo3/0/0:10 (513 MHz) | initi | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |
| Mo3/0/0:11 (519 MHz) | initi | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |
| Mo3/0/0:2 (465 MHz)  | initi | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |
| Mo3/0/0:3 (471 MHz)  | initi | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |
| Mo3/0/0:4 (477 MHz)  | initi | 81    | 0    | 5(0)     | 0(0) | 5(0) | 0    | 0   |
| Mo3/0/0:5 (483 MHz)  | up    | 81    | 0    | 7(7)     | 7(7) | 0(0) | 0    | 0   |
| Mo3/0/0:6 (489 MHz)  | initi | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |
| Mo3/0/0:7 (495 MHz)  | initi | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |
| Mo3/0/0:8 (501 MHz)  | initi | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |
| Mo3/0/0:9 (507 MHz)  | initi | 81    | 0    | 0(0)     | 0(0) | 0(0) | 0    | 0   |

**Related Commands**

| Command                                     | Description                                                                                                                  |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance group policy ugs</b>  | Configures how the Cisco CMTS should load balance cable modems with active unsolicited grant service (UGS) service flows.    |
| <b>cable load-balance group threshold</b>   | Configures the threshold values that a load balancing group should use for load balancing operations.                        |
| <b>show cable load-balance docsis-group</b> | Displays real time configurational, statistical, and operational information of the load balancing operations on the router. |

# show cable load-balance docsis-group

To display real-time configurational, statistical, and operational information of the load balancing (LB) operations on the router, use the **show cable load-balance docsis-group** command in privileged EXEC mode.

## Cisco uBR10012 Router

```
show cable load-balance docsis-group {docsis-group-id | FN fn-id MD cable
slot/subslot/{controller-interface-index}} [all | load | pending | restrict | statistics | target |
modem-list | primary-load]
```

## Cisco uBR7225VXR and Cisco uBR7246VXR Routers

```
show cable load-balance docsis-group {docsis-group-id | {FN fn-id MD cable slot/port}} [all |
init-tech-ovr | load | modem-list | pending | service-type-id | statistics | tag | target | vdoc]
```

| Syntax                                                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>docsis-group-id</i>                                       | DOCSIS load balancing group ID. The group ID is in the range of 1 to 2147483647.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>FN</b> <i>fn-id</i>                                       | Specifies the fiber node (FN) where certain DOCSIS 3.0 GLBG parameters, such as <b>disable</b> , <b>docsis-policy</b> , <b>init-tech-list</b> , <b>interval</b> , <b>method</b> , <b>policy</b> , and <b>threshold</b> , can be configured.                                                                                                                                                                                                                                                  |
| <b>MD cable</b><br><i>slot/subslot/cable-interface-index</i> | Specifies the MAC domain interface of the fiber node. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. The permitted range is from 5 to 8.</li> <li><i>subslot</i>—Subslot where the line card resides. The available slots are 0 or 1.</li> <li><i>cable-interface-index</i>—Downstream controller number on the line card. The permitted range is from 0 to 4.</li> </ul>                                                                              |
| <b>MD cable</b> <i>slot/port</i>                             | Specifies the MAC domain interface of the fiber node on the Cisco uBR7246VXR or Cisco uBR7225VXR routers. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> </ul> </li> <li><i>port</i>—The downstream controller port on the line card. The permitted values are 0 or 1.</li> </ul> |
| <b>all</b>                                                   | (Optional) Displays all load balancing group information.                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>init-tech-ovr</b>                                         | (Optional) Displays the initialization technique override rules associated with this DOCSIS load balancing group (LBG).                                                                                                                                                                                                                                                                                                                                                                      |
| <b>load</b>                                                  | (Optional) Displays current interface load and LBG assignments.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>modem-list</b>                                            | (Optional) Displays cable modems assigned to the specified DOCSIS LBG.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>pending</b>                                               | (Optional) Displays a list of cable modems that are pending movement from one downstream or upstream to another.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>primary-load</b>                                          | (Optional) Displays the primary channel load information for specified DOCSIS LBG.                                                                                                                                                                                                                                                                                                                                                                                                           |

## ■ show cable load-balance docsis-group

|                        |                                                                                                            |
|------------------------|------------------------------------------------------------------------------------------------------------|
| <b>restrict</b>        | (Optional) Displays the restricted cable modem list associated with this DOCSIS LBG.                       |
| <b>service-type-id</b> | (Optional) Displays information about the service type ID list associated with this DOCSIS LBG.            |
| <b>statistics</b>      | (Optional) Displays cumulative statistics of load balancing operations for one group.                      |
| <b>tag</b>             | (Optional) Displays the tag list associated with this DOCSIS LBG.                                          |
| <b>target</b>          | (Optional) Displays current and target interfaces (upstream and downstream) used for load balancing.       |
| <b>vdoc</b>            | (Optional) Displays information about the state of the video-over-DOCSIS (vdoc) LB for the particular LBG. |

**Command Default**

Displays information of all load balancing groups for each cable interface with its current load and load balancing status.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                                               |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced.                                                                                                                                                                                                                                                                               |
| 12.2(33)SCF | The output for this command is enhanced to include more load balancing statistics for cable modems (CMs) provisioned in the multiple receive channel (MRC) and multiple transmit channel (MTC) mode.<br><br>The output for the <b>load</b> keyword includes information about narrowband and wideband CMs. |
| 12.2(33)SCH | This command was modified. The <b>primary-load</b> keyword was added. The output for this command is enhanced to include a new field MUPFXLR that provides more status information for the <b>modem-list</b> keyword.                                                                                      |

**Usage Guidelines**

Use the **show cable load-balance docsis-group** command to display the current, real-time statistics for load balancing operations.

In Cisco IOS Release 12.2(33)SCH, the **primary-load** keyword was added to to display the primary channel load information. The **primary-load** keyword is optional and is used with *docsis-group-id*.

**Associated Features**

The **show cable load-balance docsis-group primary-load** command is associated with [Target RCS Selection for Static Load Balancing](#) feature.

**Examples**

The following is a sample output of the **show cable load-balance docsis-group** command:

```
Router# show cable load-balance docsis-group 1

DOCSIS 2.0 LB Enabled: Yes DOCSIS 3.0 LB Enabled: No
DOCSIS Group Status Interval DCC mask Policy Method Threshold
```

|       |       |       |             |       |               |
|-------|-------|-------|-------------|-------|---------------|
| Group | Index |       | /UCC        | DS/US | M/E/U/P/S     |
| 1     | 82    | RE 10 | 0x40(1)/Y 0 | m/m   | 5/10/70/70/50 |

The following is a sample output of the **show cable load-balance docsis-group load** command:

Router# **show cable load-balance docsis-group 1 load**

```
DOCSIS load-balancing load
Interface State Group Utilization Rsvd NBCM WB/UB Flows Weight
 Index
Cable7/0/0 (333 MHz) up 81 1%(0%/1%) 0% 3 8 7 37
Cable7/0/0/U0 up 81 1% 0% 21 2 23 7.6
Cable7/0/0/U1 up 81 1% 0% 19 3 22 7.6
Cable7/0/0/U2 up 81 1% 0% 20 1 23 7.6
Cable7/0/0/U3 up 81 1% 0% 21 1 24 7.6
Mo1/0/0:0 (501 MHz) up 81 1%(0%/1%) 0% 2 48 2 36
Mo1/0/0:0/U0 up 81 1% 0% 21 2 23 7.6
Mo1/0/0:0/U1 up 81 1% 0% 19 3 22 7.6
Mo1/0/0:0/U2 up 81 1% 0% 20 1 23 7.6
Mo1/0/0:0/U3 up 81 1% 0% 21 1 24 7.6
Mo1/0/0:1 (507 MHz) up 81 1%(0%/1%) 0% 2 47 2 36
Mo1/0/0:1/U0 up 81 1% 0% 21 2 23 7.6
Mo1/0/0:1/U1 up 81 1% 0% 19 3 22 7.6
Mo1/0/0:1/U2 up 81 1% 0% 20 1 23 7.6
Mo1/0/0:1/U3 up 81 1% 0% 21 1 24 7.6
Mo1/0/0:2 (513 MHz) up 81 1%(0%/1%) 0% 3 40 3 36
Mo1/0/0:2/U0 up 81 1% 0% 21 2 23 7.6
Mo1/0/0:2/U1 up 81 1% 0% 19 3 22 7.6
Mo1/0/0:2/U2 up 81 1% 0% 20 1 23 7.6
Mo1/0/0:2/U3 up 81 1% 0% 21 1 24 7.6
Mo1/0/0:3 (519 MHz) up 81 1%(0%/1%) 0% 2 47 2 36
Mo1/0/0:3/U0 up 81 1% 0% 21 2 23 7.6
Mo1/0/0:3/U1 up 81 1% 0% 19 3 22 7.6
Mo1/0/0:3/U2 up 81 1% 0% 20 1 23 7.6
Mo1/0/0:3/U3 up 81 1% 0% 21 1 24 7.6
```

The following is a sample output of the **show cable load-balance docsis-group load** command in Cisco IOS Release 12.2(33)SCF and later releases displaying sample wideband (WB), narrowband (NB), or mixed cable modem details. The NBCM and WB/upstream bonding (UB) columns display information about DOCSIS 3.0 MRC-only and MTC CMs for DOCSIS static modem-count based load balancing:

Router# **show cable load-balance docsis-group 60 load**

```
DOCSIS load-balancing load
Interface State Group Utilization Rsvd NBCM WB/UB Flows Weight
 Index
Mo1/0/0:0 (423 MHz) initial 81 0%(0%/0%) 0% 0 7 0 36
Mo1/0/0:0/U0 up 81 0% 0% 2 0 10 5.1
Mo1/0/0:0/U1 up 81 0% 0% 3 0 15 5.1
Mo1/0/0:0/U2 up 81 0% 0% 2 0 10 5.1
Mo1/0/0:0/U3 up 81 0% 0% 3 0 15 5.1
Mo1/0/0:4 (447 MHz) initial 81 0%(0%/0%) 0% 0 3 0 36
Mo1/0/0:4/U0 up 81 0% 0% 2 0 10 5.1
Mo1/0/0:4/U1 up 81 0% 0% 3 0 15 5.1
Mo1/0/0:4/U2 up 81 0% 0% 2 0 10 5.1
Mo1/0/0:4/U3 up 81 0% 0% 3 0 15 5.1
```

Table 80 describes the DOCSIS 3.0 load balancing counter definition in Cisco IOS Release 12.2(33)SCF:

**Table 80 DOCSIS 3.0 Load Balancing Counter Definition**

| Modem<br>Operating<br>Mode         | NBCM Total         |                  | WB/UB Total                 |                        | Flows                              |                                      |
|------------------------------------|--------------------|------------------|-----------------------------|------------------------|------------------------------------|--------------------------------------|
|                                    | Downstream<br>(DS) | Upstream<br>(US) | DS                          | US                     | DS                                 | US                                   |
| Non-MRC mode<br>(online, NB CM)    | Count primary      | Count single US  | Not counted                 | Not counted            | Count service flow (SF) of primary | Count SF of single US                |
| MRC mode only<br>(w-online, WB CM) | Not counted        | Count single US  | Count primary and secondary | Count single US        | Not counted                        | Count SF of single US                |
| MTC mode<br>(UB online, UB CM)     | Not counted        | Not counted      | Count primary and secondary | Count all TCS channels | Not counted                        | Not counted on upstream TCS channels |

The following is a sample output of the **show cable load-balance docsis-group pending** command in Cisco IOS Release 12.2(33)SCE and earlier releases.

Router# **show cable load-balance docsis-group 70 pending**

| Modem          | Grp | Idx | Primary     | RF/RCC      | MD/TCS | Action | Active       | Retries  |
|----------------|-----|-----|-------------|-------------|--------|--------|--------------|----------|
|                |     |     | Src         | Target      | Src    | Target | Time         |          |
| 001c.ea37.9bda | 81  |     | Mo1/0/0:2/1 | Mo1/0/0:3/0 | 60/4   | 60/4   | REINIT 00:44 | 0 DOCSIS |
| 3.0 LB         |     |     |             |             |        |        |              |          |
| 001c.ea37.9ab0 | 81  |     | Mo1/0/0:1/2 | Mo1/0/0:2/0 | 60/4   | 60/2   | REINIT 00:41 | 0 DOCSIS |
| 3.0 LB         |     |     |             |             |        |        |              |          |
| 001c.ea37.9aa6 | 81  |     | Mo1/0/0:0/1 | Mo1/0/0:1/0 | 60/1   | 60/4   | REINIT 00:50 | 0 DOCSIS |
| 3.0 LB         |     |     |             |             |        |        |              |          |
| 001c.ea37.9b1e | 81  |     | Mo1/0/0:1/1 | Mo1/0/0:0/0 | 60/2   | 60/2   | REINIT 00:44 | 0 DOCSIS |
| 3.0 LB         |     |     |             |             |        |        |              |          |
| 001c.ea37.9a8c | 81  |     | Mo1/0/0:3/2 | Mo1/0/0:2/0 | 60/4   | 60/2   | REINIT 00:41 | 0 DOCSIS |
| 3.0 LB         |     |     |             |             |        |        |              |          |
| 001c.ea37.9aee | 81  |     | Mo1/0/0:3/2 | Mo1/0/0:2/0 | 60/8   | 60/4   | REINIT 00:52 | 0 DOCSIS |
| 3.0 LB         |     |     |             |             |        |        |              |          |
| 001c.ea37.9a8a | 81  |     | Mo1/0/0:0/1 | Mo1/0/0:3/0 | 60/8   | 60/1   | REINIT 00:55 | 0 DOCSIS |
| 3.0 LB         |     |     |             |             |        |        |              |          |

The following is a sample output of the **show cable load-balance docsis-group pending** command for DOCSIS 3.0 cable modems with MTC mode in Cisco IOS Release 12.2(33)SCF and later releases:

Router# **show cable load-balance docsis-group 81 pending**

| Modem          | GrpIdx | Primary     | RF/RCC      | MD/TCS | Action | Active | Retries |
|----------------|--------|-------------|-------------|--------|--------|--------|---------|
|                |        | Src         | Target      | Src    | Target | Time   |         |
| 0000.cad6.eece | 81     | In6/0/2:3/0 | In6/0/0:0/0 |        | DCC    | 00:01  | 0       |

The following is a sample output of the **show cable load-balance docsis-group statistics** command.



Router# **show cable load-balance docsis-group 1 statistics**

| Target interface   | State   | Transfers |         |         |          |
|--------------------|---------|-----------|---------|---------|----------|
|                    |         | Complete  | Pending | Retries | Failures |
| Cable1/0 (453 MHz) | up      | 0         | 0       | 0       | 0        |
| Cable1/0/U2        | down    | 0         | 0       | 0       | 0        |
| Cable1/1 (459 MHz) | initial | 0         | 0       | 0       | 0        |
| Cable1/1/U0        | initial | 0         | 0       | 0       | 0        |
| Cable1/1/U1        | initial | 0         | 0       | 0       | 0        |
| Cable1/1/U2        | initial | 0         | 0       | 0       | 0        |
| Cable1/1/U3        | initial | 0         | 0       | 0       | 0        |

The following is a sample output of the **show cable load-balance docsis-group target** command.

Router# **show cable load-balance docsis-group 1 target**

| Interface          | State   | Group Index | Target                       |
|--------------------|---------|-------------|------------------------------|
| Cable1/0 (453 MHz) | up      | 82          | Cable1/1 (459 MHz) [enforce] |
| Cable1/0/U2        | down    | 82          |                              |
| Cable1/1 (459 MHz) | initial | 82          |                              |
| Cable1/1/U0        | initial | 82          |                              |
| Cable1/1/U1        | initial | 82          |                              |
| Cable1/1/U2        | initial | 82          |                              |
| Cable1/1/U3        | initial | 82          |                              |

The following is a sample output of the **show cable load-balance docsis-group modem-list** command on the integrated cable configuration:

Router# **show cable load-balance docsis-group 1 modem-list**

| Primary DS    | Grp | Idx | MAC Address      | RCC-ID | Bad RfId | Priority |
|---------------|-----|-----|------------------|--------|----------|----------|
| Cable7/0/0/U0 | 81  | (1) | 001c.ea37.9b3e 2 |        | 0        |          |
| Cable7/0/0/U1 | 81  | (1) | 001c.ea37.9b28 2 |        | 0        |          |
| Cable7/0/0/U2 | 81  | (1) | 001c.ea37.9bf4 2 |        | 0        |          |
| Cable7/0/0/U3 | 81  | (1) | 001c.ea37.9b5e 2 |        | 0        |          |
| In8/1/0:0/U0  | 81  | (2) | 0014.f82f.74f6   |        | !        |          |



#### Note

The priority for an excluded modem is displayed as "!".

Effective from Cisco IOS Release 12.2(33)SCH, the output of the **show cable load-balance docsis-group** command is modified to include an additional field MUPFXLR to display more status information. [Table 81](#) describes the upper case letters that indicate the status in the new field.

The following example shows the modified output of the **show cable load-balance docsis-group** command:

```
Router#show cable load-balance docsis-group fn 1 md c6/0/0 modem-list
Load for five secs: 1%/0%; one minute: 2%; five minutes: 1%
Time source is NTP, 13:39:31.300 PDT Thu Mar 28 2013
Codes: M - Multicast, U - UGS, P - PCMM, F - Max-Failures, X - eXcluded
 L - L2vpn, R - RSVP
Primary DS Grp Idx MAC Address RCC-ID Bad Rfid Priority MUPFXLR
In6/0/0:0/UB 40448 (6)
 e448.c70c.98af 1 2 -----
 e448.c70c.9b76 1 2 -----
 e448.c70c.9c15 1 2 -----
```

## ■ show cable load-balance docsis-group

```

 e448.c70c.9a92 1 2 -----
 e448.c70c.99e4 1 2 -----
 e448.c70c.9a35 1 2 -----
In6/0/0:0/U0 40448 (0)
In6/0/0:0/U1 40448 (1)
 e448.c70c.9915 2 -----
In6/0/0:0/U2 40448 (0)
In6/0/0:0/U3 40448 (0)
In6/0/0:1/UB 40448 (5)
 e448.c70c.9abc 1 2 -----
 e448.c70c.993f 1 2 -----
 e448.c70c.9927 1 2 -----
 e448.c70c.9b82 1 2 -----
 4458.2945.2cb8 1 2 -----
In6/0/0:1/U0 40448 (0)
In6/0/0:1/U1 40448 (0)
In6/0/0:1/U2 40448 (0)
In6/0/0:1/U3 40448 (0)
In6/0/0:2/UB 40448 (5)
 e448.c70c.9759 1 2 -----
 e448.c70c.9a0e 1 2 -----
 e448.c70c.992d 1 2 -----
 e448.c70c.9a38 1 2 -----
 0025.2ed9.9984 1 2 -----L-
In6/0/0:2/U0 40448 (0)
In6/0/0:2/U1 40448 (0)
In6/0/0:2/U2 40448 (0)
In6/0/0:2/U3 40448 (0)
In6/0/0:3/UB 40448 (5)
 e448.c70c.9c00 1 2 -----
 e448.c70c.99a5 1 2 -----
 e448.c70c.9a5f 1 2 -----
 e448.c70c.9a3b 1 2 -----
 e448.c70c.96b1 1 2 -----
In6/0/0:3/U0 40448 (0)
In6/0/0:3/U1 40448 (0)
In6/0/0:3/U2 40448 (0)
In6/0/0:3/U3 40448 (0)

```

**Table 81** *show cable load-balance docsis-group - Field Description for MUPFXLR status field*

| Field                             | Description                                                                                                                                                                                                   |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MUPFXLR field descriptions</b> |                                                                                                                                                                                                               |
| Multicast (M)                     | Multicast session operating on the modem. It indicates a host behind a cable modem that has joined an IGMP group. Verify this status using the <b>show cable modem verbose   in Features Bitmask</b> command. |
| UGS (U)                           | Indicates that a cable modem has UGS service flows. This configuration can be verified by <b>show cable modem qos   in UGS</b>                                                                                |
| Packetcable (P)                   | Indicates that a cable modem has one or more Packetcable gate. This status can be verified by <b>show packetcable gate summary</b> and <b>show cable modem cpe</b> commands.                                  |
| max-Failures (F)                  | Indicates that a cable modem has reached maximum failure threshold. This status can be verified by the <b>show cable modem internal load</b> command.                                                         |

| Field        | Description                                                                                                                                                                |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| eXcluded (X) | Indicates that a cable modem is listed in the list of excluded modems. This status can be verified by the <b>show running-config   begin load-balance exclude</b> command. |
| L2VPN (L)    | Indicates that a cable modem is provisioned in L2VPN service. This status can be verified by the <b>show cable l2-vpn xconnect</b> command.                                |
| RSVP (R)     | Indicates that a cable modem has RSVP flows. This status can be verified by the <b>show cable modem verbose   in Features Mask</b> command.                                |

The following is a sample output of the **show cable load-balance docsis-group modem-list** command on the modular cable configuration:

Router# **show cable load-balance docsis-group 23 modem-list**

```

Primary DS Grp Idx MAC Address RCC-ID Bad RfId Priority
Mo6/1/0:0/U0 81 (0)
Mo6/1/0:0/U8 81 (0)
Mo6/1/0:0/U1 81 (0)
Mo6/1/0:0/U2 81 (0)
Mo6/1/0:0/U3 81 (0)
Mo6/1/0:0/U4 81 (0)
Mo6/1/0:0/U5 81 (0)
Mo6/1/0:0/U6 81 (0)
Mo6/1/0:0/U7 81 (0)
Mo6/1/0:1/U0 81 (0)
Mo6/1/0:1/U8 81 (0)
Mo6/1/0:1/U1 81 (0)
Mo6/1/0:1/U2 81 (1)
 001a.c30c.7e9a 5 0
Mo6/1/0:1/U3 81 (0)
Mo6/1/0:1/U4 81 (0)
Mo6/1/0:1/U5 81 (0)
Mo6/1/0:1/U6 81 (0)
Mo6/1/0:1/U7 81 (0)

```

The following is a sample output of the **show cable load-balance docsis-group modem-list** command on a fiber node topology configuration:

Router# **show cable load-balance docsis-group fn 2 md cable 6/0/0 modem-list**

```

CM List - LBG : 40449
Primary DS MAC Address RCC-ID
In6/0/0:2/UB (0)
In6/0/0:3/UB (1)
 0025.2e2d.7322 2
In6/0/1:0/UB (2)
 0025.2e2d.7326 1
 0025.2e2d.7338 1

```

The following is a sample output for the **show cable load-balance docsis-group modem-list** command for the DOCSIS 3.0 GLBG:

Router# **show cable load-balance docsis-group fn 2 md cable 7/0/0 modem-list**

```

Primary DS Grp Idx MAC Address RCC-ID Bad RfId Priority
Cable7/0/0/U0 48129 (0)
Cable7/0/0/U1 48129 (0)

```

# show cable load-balance docsis-group

```

Cable7/0/0/U2 48129 (0)
Cable7/0/0/U3 48129 (0)
Mo1/0/0:0/UB 48129 (6)
 0025.2eaf.6bbc 1 0
 001e.6bfb.000c 1 0
 001a.c3ff.d354 1 0
 0023.be50.e5aa 1 0
 001e.6bfb.1a3a 1 0
Mo1/0/0:0/U0 48129 (0)
Mo1/0/0:0/U1 48129 (0)
Mo1/0/0:0/U2 48129 (0)
Mo1/0/0:0/U3 48129 (0)
Mo1/0/0:1/U0 48129 (0)
Mo1/0/0:1/U1 48129 (0)
Mo1/0/0:1/U2 48129 (0)
Mo1/0/0:1/U3 48129 (0)
Mo1/0/0:2/UB 48129 (2)
 001a.c3ff.d87a 1 0
 001e.6bfb.71b0 2 0
Mo1/0/0:2/U0 48129 (0)
Mo1/0/0:2/U1 48129 (0)
Mo1/0/0:2/U2 48129 (0)
Mo1/0/0:2/U3 48129 (0)
Mo1/0/0:3/UB 48129 (1)
 001e.6bff.8af2 1 0
Mo1/0/0:3/U0 48129 (0)
Mo1/0/0:3/U1 48129 (0)
Mo1/0/0:3/U2 48129 (0)
Mo1/0/0:3/U3 48129 (0)

```

The following is a sample output for the **show cable load-balance docsis-group pending** command:

Router# **show cable load-balance docsis-group fn 2 md cable 7/0/0 pending**

| Modem          | Grp   | Idx | Primary     | RF/RCC      | MD/TCS | Action | Active | Retries |
|----------------|-------|-----|-------------|-------------|--------|--------|--------|---------|
|                |       |     | Src         | Target      | Src    | Target | Time   |         |
| 001e.6bfb.000c | 48129 |     | Mo1/0/0:0/1 | Mo1/0/0:3/2 | 60/12  | 60/12  | REINIT | 00:20 0 |
| DOCSIS 3.0 LB  |       |     |             |             |        |        |        |         |
| 001e.6bfb.71b0 | 48129 |     | Mo1/0/0:2/2 | Mo1/0/0:2/1 | 60/12  | 60/5   | REINIT | 00:22 0 |
| DOCSIS 3.0 LB  |       |     |             |             |        |        |        |         |
| 001e.6bfc.d030 | 48129 |     | Mo1/0/0:0/1 | Mo1/0/0:3/2 | 60/3   | 60/3   | REINIT | 00:03 0 |
| DOCSIS 3.0 LB  |       |     |             |             |        |        |        |         |

The following is a sample output of the **show cable load-balance docsis-group all** command. This command displays information of all options in this command.

Router# **show cable load-balance docsis-group 1 all**

DOCSIS LB Enabled: Yes

| DOCSIS | Group | Status | Interval  | DCC mask | Policy | Method        | Threshold |
|--------|-------|--------|-----------|----------|--------|---------------|-----------|
| Group  | Index |        | /UCC      |          |        | DS/US         | M/E/U/P/S |
| 1      | 82    | RE 10  | 0x40(1)/Y | 0        | m/m    | 5/10/70/70/50 |           |

Current load:

| Interface          | State   | Group | Utilization | Reserved | Modems | Flows | Weight |
|--------------------|---------|-------|-------------|----------|--------|-------|--------|
|                    |         | Index |             |          |        |       |        |
| Cable1/0 (453 MHz) | up      | 82    | 0%(0%/0%)   | 0%       | 13     | 26    | 26     |
| Cable1/0/U2        | down    | 82    | 0%          | 0%       | 0      | 0     | 0.0    |
| Cable1/1 (459 MHz) | initial | 82    | 0%(0%/0%)   | 0%       | 0      | 0     | 26     |
| Cable1/1/U0        | initial | 82    | 0%          | 0%       | 0      | 0     | 2.5    |
| Cable1/1/U1        | initial | 82    | 0%          | 0%       | 0      | 0     | 2.5    |
| Cable1/1/U2        | initial | 82    | 0%          | 0%       | 0      | 0     | 2.5    |
| Cable1/1/U3        | initial | 82    | 0%          | 0%       | 0      | 0     | 2.5    |

Target assignments:

| Interface          | State   | Group<br>Index | Target                       |
|--------------------|---------|----------------|------------------------------|
| Cable1/0 (453 MHz) | up      | 82             | Cable1/1 (459 MHz) [enforce] |
| Cable1/0/U2        | down    | 82             |                              |
| Cable1/1 (459 MHz) | initial | 82             |                              |
| Cable1/1/U0        | initial | 82             |                              |
| Cable1/1/U1        | initial | 82             |                              |
| Cable1/1/U2        | initial | 82             |                              |
| Cable1/1/U3        | initial | 82             |                              |

Statistics:

| Target interface   | State   | Transfers |         |         |          |
|--------------------|---------|-----------|---------|---------|----------|
|                    |         | Complete  | Pending | Retries | Failures |
| Cable1/0 (453 MHz) | up      | 0         | 0       | 0       | 0        |
| Cable1/0/U2        | down    | 0         | 0       | 0       | 0        |
| Cable1/1 (459 MHz) | initial | 0         | 0       | 0       | 0        |
| Cable1/1/U0        | initial | 0         | 0       | 0       | 0        |
| Cable1/1/U1        | initial | 0         | 0       | 0       | 0        |
| Cable1/1/U2        | initial | 0         | 0       | 0       | 0        |
| Cable1/1/U3        | initial | 0         | 0       | 0       | 0        |

Pending:

|       |         |                  |                  |         |
|-------|---------|------------------|------------------|---------|
| Modem | Grp Idx | Source interface | Target interface | Retries |
|-------|---------|------------------|------------------|---------|

The following is a sample output of the **show cable load-balance docsis-group all** command in Cisco IOS Release 12.2(33)SCF and later releases:

Router# **show cable load balance docsis-group 70 all**

DOCSIS LB Enabled: Yes

| DOCSIS<br>Group | Group<br>Index | Status | Interval | DCC mask<br>/UCC | Policy | Method | Threshold<br>M/E/U/P/S |
|-----------------|----------------|--------|----------|------------------|--------|--------|------------------------|
| 1               | 81             | RE     | 30       | 0x78(1)/N 0      |        | m/m    | 1/1/70/70/50           |

Current load:

| DOCSIS load-balancing load |       |                |             |      |               |                |       |        |  |
|----------------------------|-------|----------------|-------------|------|---------------|----------------|-------|--------|--|
| Interface                  | State | Group<br>Index | Utilization | Rsvd | NBCM<br>Total | WB/UB<br>Total | Flows | Weight |  |
| Cable7/0/0 (333 MHz)       | up    | 81             | 0%(0%/0%)   | 0%   | 3             | 8              | 7     | 37     |  |
| Cable7/0/0/U0              | up    | 81             | 0%          | 0%   | 22            | 10             | 32    | 7.6    |  |
| Cable7/0/0/U1              | up    | 81             | 0%          | 0%   | 19            | 13             | 32    | 7.6    |  |
| Cable7/0/0/U2              | up    | 81             | 0%          | 0%   | 22            | 8              | 31    | 7.6    |  |
| Cable7/0/0/U3              | up    | 81             | 0%          | 0%   | 22            | 7              | 30    | 7.6    |  |
| Mo1/0/0:0 (501 MHz)        | up    | 81             | 0%(0%/0%)   | 0%   | 3             | 61             | 3     | 36     |  |
| Mo1/0/0:0/U0               | up    | 81             | 0%          | 0%   | 22            | 10             | 32    | 7.6    |  |
| Mo1/0/0:0/U1               | up    | 81             | 0%          | 0%   | 19            | 13             | 32    | 7.6    |  |
| Mo1/0/0:0/U2               | up    | 81             | 0%          | 0%   | 22            | 8              | 31    | 7.6    |  |
| Mo1/0/0:0/U3               | up    | 81             | 0%          | 0%   | 22            | 7              | 30    | 7.6    |  |
| Mo1/0/0:1 (507 MHz)        | up    | 81             | 0%(0%/0%)   | 0%   | 1             | 59             | 1     | 36     |  |
| Mo1/0/0:1/U0               | up    | 81             | 0%          | 0%   | 22            | 10             | 32    | 7.6    |  |
| Mo1/0/0:1/U1               | up    | 81             | 0%          | 0%   | 19            | 13             | 32    | 7.6    |  |
| Mo1/0/0:1/U2               | up    | 81             | 0%          | 0%   | 22            | 8              | 31    | 7.6    |  |
| Mo1/0/0:1/U3               | up    | 81             | 0%          | 0%   | 22            | 7              | 30    | 7.6    |  |
| Mo1/0/0:2 (513 MHz)        | up    | 81             | 0%(0%/0%)   | 0%   | 2             | 57             | 2     | 36     |  |
| Mo1/0/0:2/U0               | up    | 81             | 0%          | 0%   | 22            | 10             | 32    | 7.6    |  |
| Mo1/0/0:2/U1               | up    | 81             | 0%          | 0%   | 19            | 13             | 32    | 7.6    |  |
| Mo1/0/0:2/U2               | up    | 81             | 0%          | 0%   | 22            | 8              | 31    | 7.6    |  |
| Mo1/0/0:2/U3               | up    | 81             | 0%          | 0%   | 22            | 7              | 30    | 7.6    |  |

# show cable load-balance docsis-group

```

Mo1/0/0:3 (519 MHz) up 81 0%(0%/0%) 0% 1 60 1 36
Mo1/0/0:3/U0 up 81 0% 0% 22 10 32 7.6
Mo1/0/0:3/U1 up 81 0% 0% 19 13 32 7.6
Mo1/0/0:3/U2 up 81 0% 0% 22 8 31 7.6
Mo1/0/0:3/U3 up 81 0% 0% 22 7 30 7.6

```

## Target assignments:

| Interface            | State | Group Index | Target                        |
|----------------------|-------|-------------|-------------------------------|
| Cable7/0/0 (333 MHz) | up    | 81          | Mo1/0/0:1 (507 MHz) [enforce] |
| Cable7/0/0/U0        | up    | 81          | Cable7/0/0/U1 [enforce]       |
| Cable7/0/0/U1        | up    | 81          |                               |
| Cable7/0/0/U2        | up    | 81          | Cable7/0/0/U1 [enforce]       |
| Cable7/0/0/U3        | up    | 81          | Cable7/0/0/U1 [enforce]       |
| Mo1/0/0:0 (501 MHz)  | up    | 81          | Mo1/0/0:1 (507 MHz) [enforce] |
| Mo1/0/0:0/U0         | up    | 81          | Mo1/0/0:0/U1 [enforce]        |
| Mo1/0/0:0/U1         | up    | 81          |                               |
| Mo1/0/0:0/U2         | up    | 81          | Mo1/0/0:0/U1 [enforce]        |
| Mo1/0/0:0/U3         | up    | 81          | Mo1/0/0:0/U1 [enforce]        |
| Mo1/0/0:1 (507 MHz)  | up    | 81          |                               |
| Mo1/0/0:1/U0         | up    | 81          | Mo1/0/0:1/U1 [enforce]        |
| Mo1/0/0:1/U1         | up    | 81          |                               |
| Mo1/0/0:1/U2         | up    | 81          | Mo1/0/0:1/U1 [enforce]        |
| Mo1/0/0:1/U3         | up    | 81          | Mo1/0/0:1/U1 [enforce]        |
| Mo1/0/0:2 (513 MHz)  | up    | 81          |                               |
| Mo1/0/0:2/U0         | up    | 81          | Mo1/0/0:2/U1 [enforce]        |
| Mo1/0/0:2/U1         | up    | 81          |                               |
| Mo1/0/0:2/U2         | up    | 81          | Mo1/0/0:2/U1 [enforce]        |
| Mo1/0/0:2/U3         | up    | 81          | Mo1/0/0:2/U1 [enforce]        |
| Mo1/0/0:3 (519 MHz)  | up    | 81          |                               |
| Mo1/0/0:3/U0         | up    | 81          | Mo1/0/0:3/U1 [enforce]        |
| Mo1/0/0:3/U1         | up    | 81          |                               |
| Mo1/0/0:3/U2         | up    | 81          | Mo1/0/0:3/U1 [enforce]        |
| Mo1/0/0:3/U3         | up    | 81          | Mo1/0/0:3/U1 [enforce]        |

## Statistics:

| Target interface     | State | Transfers |         |         |          |
|----------------------|-------|-----------|---------|---------|----------|
|                      |       | Complete  | Pending | Retries | Failures |
| Cable7/0/0 (333 MHz) | up    | 6         | 0       | 0       | 0        |
| Cable7/0/0/U0        | up    | 29        | 0       | 0       | 0        |
| Cable7/0/0/U1        | up    | 76        | 0       | 0       | 0        |
| Cable7/0/0/U2        | up    | 43        | 0       | 0       | 0        |
| Cable7/0/0/U3        | up    | 31        | 0       | 0       | 0        |
| Mo1/0/0:0 (501 MHz)  | up    | 18        | 0       | 0       | 0        |
| Mo1/0/0:0/U0         | up    | 30        | 0       | 0       | 0        |
| Mo1/0/0:0/U1         | up    | 42        | 0       | 0       | 0        |
| Mo1/0/0:0/U2         | up    | 21        | 0       | 0       | 0        |
| Mo1/0/0:0/U3         | up    | 21        | 0       | 0       | 0        |
| Mo1/0/0:1 (507 MHz)  | up    | 17        | 0       | 0       | 0        |
| Mo1/0/0:1/U0         | up    | 9         | 0       | 0       | 0        |
| Mo1/0/0:1/U1         | up    | 18        | 0       | 0       | 0        |
| Mo1/0/0:1/U2         | up    | 15        | 0       | 0       | 0        |
| Mo1/0/0:1/U3         | up    | 20        | 0       | 0       | 0        |
| Mo1/0/0:2 (513 MHz)  | up    | 19        | 0       | 0       | 0        |
| Mo1/0/0:2/U0         | up    | 4         | 0       | 0       | 0        |
| Mo1/0/0:2/U1         | up    | 3         | 0       | 0       | 0        |
| Mo1/0/0:2/U2         | up    | 6         | 0       | 0       | 0        |
| Mo1/0/0:2/U3         | up    | 6         | 0       | 0       | 0        |
| Mo1/0/0:3 (519 MHz)  | up    | 9         | 0       | 0       | 0        |
| Mo1/0/0:3/U0         | up    | 1         | 0       | 0       | 0        |
| Mo1/0/0:3/U1         | up    | 2         | 0       | 0       | 0        |
| Mo1/0/0:3/U2         | up    | 4         | 0       | 0       | 0        |

```
Mo1/0/0:3/U3 up 4 0 0 0
```

Pending:

| Modem | Grp | Idx | Primary | RF/RCC | MD/TCS | Action | Active | Retries |
|-------|-----|-----|---------|--------|--------|--------|--------|---------|
|       |     |     | Src     | Target | Src    | Target | Time   |         |

The following is a sample output of the **show cable load-balance all** command for load balancing groups that belong to different cable line cards:

Router# **show cable load-balance all**

| Group | Interval | Method      | DCC Init  | Threshold |        |         |     |      |
|-------|----------|-------------|-----------|-----------|--------|---------|-----|------|
|       |          |             | Technique | Minimum   | Static | Enforce | Ugs | PCMM |
| 1     | 30       | modems      | 0         | 5         | 10%    | ---     | --- | ---  |
| 41    | 30       | utilization | 4         | ---       | 10%    | 20%     | --- | ---  |

DOCSIS 2.0 LB Enabled: Yes DOCSIS 3.0 LB Enabled: No

| DOCSIS | Group | Status | Interval | DCC mask  | Policy | Method | Threshold     |
|--------|-------|--------|----------|-----------|--------|--------|---------------|
| Group  | Index |        |          | /UCC      |        | DS/US  | M/E/U/P/S     |
| 1      | 81    | RE     | 30       | 0x78(1)/N | 0      | m/m    | 1/1/70/70/50  |
| 3      | 82    | RE     | 30       | 0x78(1)/N | 0      | m/m    | 1/1/70/70/50  |
| 5      | 83    | RE     | 30       | 0x78(1)/N | 0      | m/m    | 1/1/70/70/50  |
| 23     | 84    | GE     | 30       | 0xF8(0)/N | 0      | m/m    | 5/10/70/70/50 |

DOCSIS 2.0 LB Enabled: Yes DOCSIS 3.0 LB Enabled: No

| MD      | FN | Group | S | Intv | DCC mask  | Policy | Mtd | MD-CM-SG | Threshold     |
|---------|----|-------|---|------|-----------|--------|-----|----------|---------------|
|         |    | Index |   |      | /UCC      |        | D/U |          | M/E/U/P/S     |
| Ca6/1/0 | 3  | 44290 | E | 30   | 0xF8(0)/N | 0      | m/m | 0x2D0101 | 5/10/70/70/50 |
| Ca7/0/0 | 2  | 48129 | E | 20   | 0xF8(0)/N | 0      | m/m | 0x3C0101 | 5/10/70/70/50 |
| Ca8/0/0 | 1  | 55808 | E | 30   | 0xF8(0)/N | 0      | m/m | 0x5A0101 | 5/10/70/70/50 |

Current load:

DOCSIS load-balancing load

| Interface           | State   | Group | Utilization | Rsvd | NBCM  | WB/UB | Flows | Weight |
|---------------------|---------|-------|-------------|------|-------|-------|-------|--------|
|                     |         | Index |             |      | Total | Total |       |        |
| Mo6/1/0:0 (405 MHz) | initial | 82    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 36     |
| Mo6/1/0:0 (405 MHz) | initial | 44290 | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 36     |
| Mo6/1/0:0/U0        | initial | 82    | 0%          | 0%   | 0     | 0     | 0     | 7.6    |
| Mo6/1/0:0/U0        | initial | 44290 | 0%          | 0%   | 0     | 0     | 0     | 7.6    |
| Mo6/1/0:0/U1        | initial | 82    | 0%          | 0%   | 0     | 0     | 0     | 7.6    |
| Mo6/1/0:0/U1        | initial | 44290 | 0%          | 0%   | 0     | 0     | 0     | 7.6    |
| Mo6/1/0:0/U2        | initial | 82    | 0%          | 0%   | 0     | 0     | 0     | 7.6    |
| Mo6/1/0:0/U2        | initial | 44290 | 0%          | 0%   | 0     | 0     | 0     | 7.6    |
| Mo6/1/0:0/U3        | initial | 82    | 0%          | 0%   | 0     | 0     | 0     | 7.6    |
| Mo6/1/0:0/U3        | initial | 44290 | 0%          | 0%   | 0     | 0     | 0     | 7.6    |
| Mo6/1/0:1 (411 MHz) | down    | 82    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:1 (411 MHz) | down    | 44290 | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:2 (417 MHz) | down    | 82    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:2 (417 MHz) | down    | 44290 | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:3 (423 MHz) | down    | 82    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:3 (423 MHz) | down    | 44290 | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:4 (429 MHz) | down    | 82    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:4 (429 MHz) | down    | 44290 | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:5 (435 MHz) | down    | 82    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:5 (435 MHz) | down    | 44290 | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:6 (441 MHz) | down    | 82    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:6 (441 MHz) | down    | 44290 | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:7 (447 MHz) | down    | 82    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/0:7 (447 MHz) | down    | 44290 | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/1:0 (453 MHz) | down    | 82    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |
| Mo6/1/1:0 (453 MHz) | down    | 83    | 0%(0%/0%)   | 0%   | 0     | 0     | 0     | 0      |

## show cable load-balance docsis-group

```

Mo6/1/1:1 (459 MHz) down 82 0%(0%/0%) 0% 0 0 0
Mo6/1/1:1 (459 MHz) down 83 0%(0%/0%) 0% 0 0 0
Mo6/1/1:2 (465 MHz) down 82 0%(0%/0%) 0% 0 0 0
Mo6/1/1:2 (465 MHz) down 83 0%(0%/0%) 0% 0 0 0
Mo6/1/1:3 (471 MHz) down 82 0%(0%/0%) 0% 0 0 0
Mo6/1/1:3 (471 MHz) down 83 0%(0%/0%) 0% 0 0 0
Mo6/1/1:4 (477 MHz) down 82 0%(0%/0%) 0% 0 0 0
Mo6/1/1:4 (477 MHz) down 83 0%(0%/0%) 0% 0 0 0
Mo6/1/1:5 (483 MHz) down 82 0%(0%/0%) 0% 0 0 0
Mo6/1/1:5 (483 MHz) down 83 0%(0%/0%) 0% 0 0 0
Mo6/1/1:6 (489 MHz) down 82 0%(0%/0%) 0% 0 0 0
Mo6/1/1:6 (489 MHz) down 83 0%(0%/0%) 0% 0 0 0
Mo6/1/1:7 (495 MHz) down 82 0%(0%/0%) 0% 0 0 0
Mo6/1/1:7 (495 MHz) down 83 0%(0%/0%) 0% 0 0 0
DOCSIS load-balancing load
Interface State Group Utilization Rsvd NBCM WB/UB Flows Weight
Index Total Total
Cable7/0/0 (333 MHz) up 81 0%(0%/0%) 0% 2 6 7 37
Cable7/0/0 (333 MHz) up 48129 0%(0%/0%) 0% 2 6 7 37
Cable7/0/0/U0 up 81 0% 0% 21 12 33 7.6
Cable7/0/0/U0 up 48129 0% 0% 21 12 33 7.6
Cable7/0/0/U1 up 81 0% 0% 21 11 32 7.6
Cable7/0/0/U1 up 48129 0% 0% 21 11 32 7.6
Cable7/0/0/U2 up 81 0% 0% 21 10 30 7.6
Cable7/0/0/U2 up 48129 0% 0% 21 10 30 7.6
Cable7/0/0/U3 up 81 0% 0% 21 9 30 7.6
Cable7/0/0/U3 up 48129 0% 0% 21 9 30 7.6
Mo1/0/0:0 (501 MHz) up 81 0%(0%/0%) 0% 2 62 2 36
Mo1/0/0:0 (501 MHz) up 48129 0%(0%/0%) 0% 2 62 2 36
Mo1/0/0:0/U0 up 81 0% 0% 21 12 33 7.6
Mo1/0/0:0/U0 up 48129 0% 0% 21 12 33 7.6
Mo1/0/0:0/U1 up 81 0% 0% 21 11 32 7.6
Mo1/0/0:0/U1 up 48129 0% 0% 21 11 32 7.6
Mo1/0/0:0/U2 up 81 0% 0% 21 10 30 7.6
Mo1/0/0:0/U2 up 48129 0% 0% 21 10 30 7.6
Mo1/0/0:0/U3 up 81 0% 0% 21 9 30 7.6
Mo1/0/0:0/U3 up 48129 0% 0% 21 9 30 7.6
Mo1/0/0:1 (507 MHz) up 81 0%(0%/0%) 0% 1 57 1 36
Mo1/0/0:1 (507 MHz) up 48129 0%(0%/0%) 0% 1 57 1 36
Mo1/0/0:1/U0 up 81 0% 0% 21 12 33 7.6
Mo1/0/0:1/U0 up 48129 0% 0% 21 12 33 7.6
Mo1/0/0:1/U1 up 81 0% 0% 21 11 32 7.6
Mo1/0/0:1/U1 up 48129 0% 0% 21 11 32 7.6
Mo1/0/0:1/U2 up 81 0% 0% 21 10 30 7.6
Mo1/0/0:1/U2 up 48129 0% 0% 21 10 30 7.6
Mo1/0/0:1/U3 up 81 0% 0% 21 9 30 7.6
Mo1/0/0:1/U3 up 48129 0% 0% 21 9 30 7.6
Mo1/0/0:2 (513 MHz) up 81 0%(0%/0%) 0% 1 56 1 36
Mo1/0/0:2 (513 MHz) up 48129 0%(0%/0%) 0% 1 56 1 36
Mo1/0/0:2/U0 up 81 0% 0% 21 12 33 7.6
Mo1/0/0:2/U0 up 48129 0% 0% 21 12 33 7.6
Mo1/0/0:2/U1 up 81 0% 0% 21 11 32 7.6
Mo1/0/0:2/U1 up 48129 0% 0% 21 11 32 7.6
Mo1/0/0:2/U2 up 81 0% 0% 21 10 30 7.6
Mo1/0/0:2/U2 up 48129 0% 0% 21 10 30 7.6
Mo1/0/0:2/U3 up 81 0% 0% 21 9 30 7.6
Mo1/0/0:2/U3 up 48129 0% 0% 21 9 30 7.6
Mo1/0/0:3 (519 MHz) up 81 0%(0%/0%) 0% 2 62 2 36
Mo1/0/0:3 (519 MHz) up 48129 0%(0%/0%) 0% 2 62 2 36
Mo1/0/0:3/U0 up 81 0% 0% 21 12 33 7.6
Mo1/0/0:3/U0 up 48129 0% 0% 21 12 33 7.6
Mo1/0/0:3/U1 up 81 0% 0% 21 11 32 7.6
Mo1/0/0:3/U1 up 48129 0% 0% 21 11 32 7.6
Mo1/0/0:3/U2 up 81 0% 0% 21 10 30 7.6

```



```

Mo1/0/0:3/U2 up 48129 0% 0% 21 10 30 7.6
Mo1/0/0:3/U3 up 81 0% 0% 21 9 30 7.6
Mo1/0/0:3/U3 up 48129 0% 0% 21 9 30 7.6
DOCSIS load-balancing load
Interface State Group Utilization Rsvd NBCM WB/UB Flows Weight
 Index
In8/0/0:0 (555 MHz) initial 55808 0%(0%/0%) 0% 0 0 0 37
In8/0/0:0/U0 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:0/U1 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:0/U2 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:0/U3 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:1 (561 MHz) initial 55808 0%(0%/0%) 0% 0 0 0 37
In8/0/0:1/U0 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:1/U1 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:1/U2 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:1/U3 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:2 (567 MHz) initial 55808 0%(0%/0%) 0% 0 0 0 37
In8/0/0:2/U0 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:2/U1 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:2/U2 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:2/U3 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:3 (573 MHz) initial 55808 0%(0%/0%) 0% 0 0 0 37
In8/0/0:3/U0 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:3/U1 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:3/U2 initial 55808 0% 0% 0 0 0 7.6
In8/0/0:3/U3 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:0 (579 MHz) initial 55808 0%(0%/0%) 0% 0 0 0 37
In8/0/1:0/U0 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:0/U1 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:0/U2 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:0/U3 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:1 (585 MHz) initial 55808 0%(0%/0%) 0% 0 0 0 37
In8/0/1:1/U0 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:1/U1 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:1/U2 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:1/U3 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:2 (591 MHz) initial 55808 0%(0%/0%) 0% 0 0 0 37
In8/0/1:2/U0 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:2/U1 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:2/U2 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:2/U3 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:3 (597 MHz) initial 55808 0%(0%/0%) 0% 0 0 0 37
In8/0/1:3/U0 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:3/U1 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:3/U2 initial 55808 0% 0% 0 0 0 7.6
In8/0/1:3/U3 initial 55808 0% 0% 0 0 0 7.6
Mo1/0/0:4 (525 MHz) up 55808 0%(0%/0%) 0% 2 0 2 36
Mo1/0/0:4/U4 up 55808 0% 0% 1 0 1 7.6
Mo1/0/0:4/U5 up 55808 0% 0% 2 0 2 7.6
Mo1/0/0:4/U6 up 55808 0% 0% 1 0 1 7.6
Mo1/0/0:4/U7 initial 55808 0% 0% 0 0 0 7.6
Mo1/0/0:5 (531 MHz) initial 55808 0%(0%/0%) 0% 0 0 0 36
Mo1/0/0:5/U4 up 55808 0% 0% 1 0 1 7.6
Mo1/0/0:5/U5 up 55808 0% 0% 2 0 2 7.6
Mo1/0/0:5/U6 up 55808 0% 0% 1 0 1 7.6
Mo1/0/0:5/U7 initial 55808 0% 0% 0 0 0 7.6
Mo1/0/0:6 (537 MHz) up 55808 0%(0%/0%) 0% 1 0 1 36
Mo1/0/0:6/U4 up 55808 0% 0% 1 0 1 7.6
Mo1/0/0:6/U5 up 55808 0% 0% 2 0 2 7.6
Mo1/0/0:6/U6 up 55808 0% 0% 1 0 1 7.6
Mo1/0/0:6/U7 initial 55808 0% 0% 0 0 0 7.6
Mo1/0/0:7 (543 MHz) up 55808 0%(0%/0%) 0% 1 0 1 36
Mo1/0/0:7/U4 up 55808 0% 0% 1 0 1 7.6
Mo1/0/0:7/U5 up 55808 0% 0% 2 0 2 7.6

```

## show cable load-balance docsis-group

```

Mo1/0/0:7/U6 up 55808 0% 0% 1 0 1 7.6
Mo1/0/0:7/U7 initial 55808 0% 0% 0 0 0 7.6

```

Target assignments:

| Interface            | State   | Group Index | Target                        |
|----------------------|---------|-------------|-------------------------------|
| Mo6/1/0:0 (405 MHz)  | initial | 82          |                               |
| Mo6/1/0:0 (405 MHz)  | initial | 44290       |                               |
| Mo6/1/0:0/U0         | initial | 82          |                               |
| Mo6/1/0:0/U0         | initial | 44290       |                               |
| Mo6/1/0:0/U1         | initial | 82          |                               |
| Mo6/1/0:0/U1         | initial | 44290       |                               |
| Mo6/1/0:0/U2         | initial | 82          |                               |
| Mo6/1/0:0/U2         | initial | 44290       |                               |
| Mo6/1/0:0/U3         | initial | 82          |                               |
| Mo6/1/0:0/U3         | initial | 44290       |                               |
| Mo6/1/0:1 (411 MHz)  | down    | 82          |                               |
| Mo6/1/0:1 (411 MHz)  | down    | 44290       |                               |
| Mo6/1/0:2 (417 MHz)  | down    | 82          |                               |
| Mo6/1/0:2 (417 MHz)  | down    | 44290       |                               |
| Mo6/1/0:3 (423 MHz)  | down    | 82          |                               |
| Mo6/1/0:3 (423 MHz)  | down    | 44290       |                               |
| Mo6/1/0:4 (429 MHz)  | down    | 82          |                               |
| Mo6/1/0:4 (429 MHz)  | down    | 44290       |                               |
| Mo6/1/0:5 (435 MHz)  | down    | 82          |                               |
| Mo6/1/0:5 (435 MHz)  | down    | 44290       |                               |
| Mo6/1/0:6 (441 MHz)  | down    | 82          |                               |
| Mo6/1/0:6 (441 MHz)  | down    | 44290       |                               |
| Mo6/1/0:7 (447 MHz)  | down    | 82          |                               |
| Mo6/1/0:7 (447 MHz)  | down    | 44290       |                               |
| Mo6/1/1:0 (453 MHz)  | down    | 82          |                               |
| Mo6/1/1:0 (453 MHz)  | down    | 83          |                               |
| Mo6/1/1:1 (459 MHz)  | down    | 82          |                               |
| Mo6/1/1:1 (459 MHz)  | down    | 83          |                               |
| Mo6/1/1:2 (465 MHz)  | down    | 82          |                               |
| Mo6/1/1:2 (465 MHz)  | down    | 83          |                               |
| Mo6/1/1:3 (471 MHz)  | down    | 82          |                               |
| Mo6/1/1:3 (471 MHz)  | down    | 83          |                               |
| Mo6/1/1:4 (477 MHz)  | down    | 82          |                               |
| Mo6/1/1:4 (477 MHz)  | down    | 83          |                               |
| Mo6/1/1:5 (483 MHz)  | down    | 82          |                               |
| Mo6/1/1:5 (483 MHz)  | down    | 83          |                               |
| Mo6/1/1:6 (489 MHz)  | down    | 82          |                               |
| Mo6/1/1:6 (489 MHz)  | down    | 83          |                               |
| Mo6/1/1:7 (495 MHz)  | down    | 82          |                               |
| Mo6/1/1:7 (495 MHz)  | down    | 83          |                               |
| Cable7/0/0 (333 MHz) | up      | 81          | Mo1/0/0:1 (507 MHz) [enforce] |
| Cable7/0/0 (333 MHz) | up      | 48129       | Mo1/0/0:1 (507 MHz)           |
| Cable7/0/0/U0        | up      | 81          |                               |
| Cable7/0/0/U0        | up      | 48129       |                               |
| Cable7/0/0/U1        | up      | 81          | Cable7/0/0/U0                 |
| Cable7/0/0/U1        | up      | 48129       |                               |
| Cable7/0/0/U2        | up      | 81          |                               |
| Cable7/0/0/U2        | up      | 48129       |                               |
| Cable7/0/0/U3        | up      | 81          |                               |
| Cable7/0/0/U3        | up      | 48129       |                               |
| Mo1/0/0:0 (501 MHz)  | up      | 81          |                               |
| Mo1/0/0:0 (501 MHz)  | up      | 48129       |                               |
| Mo1/0/0:0/U0         | up      | 81          |                               |
| Mo1/0/0:0/U0         | up      | 48129       |                               |
| Mo1/0/0:0/U1         | up      | 81          | Mo1/0/0:0/U0                  |
| Mo1/0/0:0/U1         | up      | 48129       |                               |
| Mo1/0/0:0/U2         | up      | 81          |                               |

|                     |         |       |              |
|---------------------|---------|-------|--------------|
| Mo1/0/0:0/U2        | up      | 48129 |              |
| Mo1/0/0:0/U3        | up      | 81    |              |
| Mo1/0/0:0/U3        | up      | 48129 |              |
| Mo1/0/0:1 (507 MHz) | up      | 81    |              |
| Mo1/0/0:1 (507 MHz) | up      | 48129 |              |
| Mo1/0/0:1/U0        | up      | 81    |              |
| Mo1/0/0:1/U0        | up      | 48129 |              |
| Mo1/0/0:1/U1        | up      | 81    | Mo1/0/0:1/U0 |
| Mo1/0/0:1/U1        | up      | 48129 |              |
| Mo1/0/0:1/U2        | up      | 81    |              |
| Mo1/0/0:1/U2        | up      | 48129 |              |
| Mo1/0/0:1/U3        | up      | 81    |              |
| Mo1/0/0:1/U3        | up      | 48129 |              |
| Mo1/0/0:2 (513 MHz) | up      | 81    |              |
| Mo1/0/0:2 (513 MHz) | up      | 48129 |              |
| Mo1/0/0:2/U0        | up      | 81    |              |
| Mo1/0/0:2/U0        | up      | 48129 |              |
| Mo1/0/0:2/U1        | up      | 81    | Mo1/0/0:2/U0 |
| Mo1/0/0:2/U1        | up      | 48129 |              |
| Mo1/0/0:2/U2        | up      | 81    |              |
| Mo1/0/0:2/U2        | up      | 48129 |              |
| Mo1/0/0:2/U3        | up      | 81    |              |
| Mo1/0/0:2/U3        | up      | 48129 |              |
| Mo1/0/0:3 (519 MHz) | up      | 81    |              |
| Mo1/0/0:3 (519 MHz) | up      | 48129 |              |
| Mo1/0/0:3/U0        | up      | 81    |              |
| Mo1/0/0:3/U0        | up      | 48129 |              |
| Mo1/0/0:3/U1        | up      | 81    | Mo1/0/0:3/U0 |
| Mo1/0/0:3/U1        | up      | 48129 |              |
| Mo1/0/0:3/U2        | up      | 81    |              |
| Mo1/0/0:3/U2        | up      | 48129 |              |
| Mo1/0/0:3/U3        | up      | 81    |              |
| Mo1/0/0:3/U3        | up      | 48129 |              |
| In8/0/0:0 (555 MHz) | initial | 55808 |              |
| In8/0/0:0/U0        | initial | 55808 |              |
| In8/0/0:0/U1        | initial | 55808 |              |
| In8/0/0:0/U2        | initial | 55808 |              |
| In8/0/0:0/U3        | initial | 55808 |              |
| In8/0/0:1 (561 MHz) | initial | 55808 |              |
| In8/0/0:1/U0        | initial | 55808 |              |
| In8/0/0:1/U1        | initial | 55808 |              |
| In8/0/0:1/U2        | initial | 55808 |              |
| In8/0/0:1/U3        | initial | 55808 |              |
| In8/0/0:2 (567 MHz) | initial | 55808 |              |
| In8/0/0:2/U0        | initial | 55808 |              |
| In8/0/0:2/U1        | initial | 55808 |              |
| In8/0/0:2/U2        | initial | 55808 |              |
| In8/0/0:2/U3        | initial | 55808 |              |
| In8/0/0:3 (573 MHz) | initial | 55808 |              |
| In8/0/0:3/U0        | initial | 55808 |              |
| In8/0/0:3/U1        | initial | 55808 |              |
| In8/0/0:3/U2        | initial | 55808 |              |
| In8/0/0:3/U3        | initial | 55808 |              |
| In8/0/1:0 (579 MHz) | initial | 55808 |              |
| In8/0/1:0/U0        | initial | 55808 |              |
| In8/0/1:0/U1        | initial | 55808 |              |
| In8/0/1:0/U2        | initial | 55808 |              |
| In8/0/1:0/U3        | initial | 55808 |              |
| In8/0/1:1 (585 MHz) | initial | 55808 |              |
| In8/0/1:1/U0        | initial | 55808 |              |
| In8/0/1:1/U1        | initial | 55808 |              |
| In8/0/1:1/U2        | initial | 55808 |              |
| In8/0/1:1/U3        | initial | 55808 |              |
| In8/0/1:2 (591 MHz) | initial | 55808 |              |

## show cable load-balance docsis-group

```

In8/0/1:2/U0 initial 55808
In8/0/1:2/U1 initial 55808
In8/0/1:2/U2 initial 55808
In8/0/1:2/U3 initial 55808
In8/0/1:3 (597 MHz) initial 55808
In8/0/1:3/U0 initial 55808
In8/0/1:3/U1 initial 55808
In8/0/1:3/U2 initial 55808
In8/0/1:3/U3 initial 55808
Mo1/0/0:4 (525 MHz) up 55808
Mo1/0/0:4/U4 up 55808
Mo1/0/0:4/U5 up 55808
Mo1/0/0:4/U6 up 55808
Mo1/0/0:4/U7 initial 55808
Mo1/0/0:5 (531 MHz) initial 55808
Mo1/0/0:5/U4 up 55808
Mo1/0/0:5/U5 up 55808
Mo1/0/0:5/U6 up 55808
Mo1/0/0:5/U7 initial 55808
Mo1/0/0:6 (537 MHz) up 55808
Mo1/0/0:6/U4 up 55808
Mo1/0/0:6/U5 up 55808
Mo1/0/0:6/U6 up 55808
Mo1/0/0:6/U7 initial 55808
Mo1/0/0:7 (543 MHz) up 55808
Mo1/0/0:7/U4 up 55808
Mo1/0/0:7/U5 up 55808
Mo1/0/0:7/U6 up 55808
Mo1/0/0:7/U7 initial 55808

```

## Statistics:

| Target interface     | State   | Transfers |         |         |          |
|----------------------|---------|-----------|---------|---------|----------|
|                      |         | Complete  | Pending | Retries | Failures |
| Mo6/1/0:0 (405 MHz)  | initial | 0         | 0       | 0       | 0        |
| Mo6/1/0:0/U0         | initial | 0         | 0       | 0       | 0        |
| Mo6/1/0:0/U1         | initial | 0         | 0       | 0       | 0        |
| Mo6/1/0:0/U2         | initial | 0         | 0       | 0       | 0        |
| Mo6/1/0:0/U3         | initial | 0         | 0       | 0       | 0        |
| Mo6/1/0:1 (411 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/0:2 (417 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/0:3 (423 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/0:4 (429 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/0:5 (435 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/0:6 (441 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/0:7 (447 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/1:0 (453 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/1:1 (459 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/1:2 (465 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/1:3 (471 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/1:4 (477 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/1:5 (483 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/1:6 (489 MHz)  | down    | 0         | 0       | 0       | 0        |
| Mo6/1/1:7 (495 MHz)  | down    | 0         | 0       | 0       | 0        |
| Cable7/0/0 (333 MHz) | up      | 10        | 0       | 0       | 0        |
| Cable7/0/0/U0        | up      | 33        | 0       | 0       | 0        |
| Cable7/0/0/U1        | up      | 84        | 0       | 0       | 0        |
| Cable7/0/0/U2        | up      | 48        | 0       | 0       | 0        |
| Cable7/0/0/U3        | up      | 34        | 0       | 0       | 0        |
| Mo1/0/0:0 (501 MHz)  | up      | 19        | 0       | 0       | 0        |
| Mo1/0/0:0/U0         | up      | 34        | 0       | 0       | 0        |
| Mo1/0/0:0/U1         | up      | 49        | 0       | 0       | 0        |
| Mo1/0/0:0/U2         | up      | 23        | 0       | 0       | 0        |
| Mo1/0/0:0/U3         | up      | 22        | 0       | 0       | 0        |

|                     |         |    |   |   |   |
|---------------------|---------|----|---|---|---|
| Mo1/0/0:1 (507 MHz) | up      | 23 | 0 | 0 | 0 |
| Mo1/0/0:1/U0        | up      | 10 | 0 | 0 | 0 |
| Mo1/0/0:1/U1        | up      | 21 | 0 | 0 | 0 |
| Mo1/0/0:1/U2        | up      | 16 | 0 | 0 | 0 |
| Mo1/0/0:1/U3        | up      | 21 | 0 | 0 | 0 |
| Mo1/0/0:2 (513 MHz) | up      | 21 | 0 | 0 | 0 |
| Mo1/0/0:2/U0        | up      | 4  | 0 | 0 | 0 |
| Mo1/0/0:2/U1        | up      | 3  | 0 | 0 | 0 |
| Mo1/0/0:2/U2        | up      | 7  | 0 | 0 | 0 |
| Mo1/0/0:2/U3        | up      | 8  | 0 | 0 | 0 |
| Mo1/0/0:3 (519 MHz) | up      | 10 | 0 | 0 | 0 |
| Mo1/0/0:3/U0        | up      | 1  | 0 | 0 | 0 |
| Mo1/0/0:3/U1        | up      | 2  | 0 | 0 | 0 |
| Mo1/0/0:3/U2        | up      | 4  | 0 | 0 | 0 |
| Mo1/0/0:3/U3        | up      | 4  | 0 | 0 | 0 |
| In8/0/0:0 (555 MHz) | initial | 0  | 0 | 0 | 0 |
| In8/0/0:0/U0        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:0/U1        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:0/U2        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:0/U3        | up      | 0  | 0 | 0 | 0 |
| In8/0/0:0/U4        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:0/U5        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:0/U6        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:0/U7        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:1 (561 MHz) | initial | 0  | 0 | 0 | 0 |
| In8/0/0:1/U0        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:1/U1        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:1/U2        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:1/U3        | up      | 0  | 0 | 0 | 0 |
| In8/0/0:1/U4        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:1/U5        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:1/U6        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:1/U7        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:2 (567 MHz) | up      | 0  | 0 | 0 | 0 |
| In8/0/0:2/U0        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:2/U1        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:2/U2        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:2/U3        | up      | 0  | 0 | 0 | 0 |
| In8/0/0:2/U4        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:2/U5        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:2/U6        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:2/U7        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:3 (573 MHz) | initial | 0  | 0 | 0 | 0 |
| In8/0/0:3/U0        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:3/U1        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:3/U2        | initial | 0  | 0 | 0 | 0 |
| In8/0/0:3/U3        | up      | 0  | 0 | 0 | 0 |
| In8/0/0:3/U4        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:3/U5        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:3/U6        | down    | 0  | 0 | 0 | 0 |
| In8/0/0:3/U7        | down    | 0  | 0 | 0 | 0 |
| In8/0/1:0 (579 MHz) | initial | 0  | 0 | 0 | 0 |
| In8/0/1:0/U0        | initial | 0  | 0 | 0 | 0 |
| In8/0/1:0/U1        | initial | 0  | 0 | 0 | 0 |
| In8/0/1:0/U2        | initial | 0  | 0 | 0 | 0 |
| In8/0/1:0/U3        | up      | 0  | 0 | 0 | 0 |
| In8/0/1:0/U4        | down    | 0  | 0 | 0 | 0 |
| In8/0/1:0/U5        | down    | 0  | 0 | 0 | 0 |
| In8/0/1:0/U6        | down    | 0  | 0 | 0 | 0 |
| In8/0/1:0/U7        | down    | 0  | 0 | 0 | 0 |
| In8/0/1:1 (585 MHz) | initial | 0  | 0 | 0 | 0 |
| In8/0/1:1/U0        | initial | 0  | 0 | 0 | 0 |
| In8/0/1:1/U1        | initial | 0  | 0 | 0 | 0 |
| In8/0/1:1/U2        | initial | 0  | 0 | 0 | 0 |

## show cable load-balance docsis-group

```

In8/0/1:1/U3 up 0 0 0 0
In8/0/1:1/U4 down 0 0 0 0
In8/0/1:1/U5 down 0 0 0 0
In8/0/1:1/U6 down 0 0 0 0
In8/0/1:1/U7 down 0 0 0 0
In8/0/1:2 (591 MHz) initial 0 0 0 0
In8/0/1:2/U0 initial 0 0 0 0
In8/0/1:2/U1 initial 0 0 0 0
In8/0/1:2/U2 initial 0 0 0 0
In8/0/1:2/U3 up 0 0 0 0
In8/0/1:2/U4 down 0 0 0 0
In8/0/1:2/U5 down 0 0 0 0
In8/0/1:2/U6 down 0 0 0 0
In8/0/1:2/U7 down 0 0 0 0
In8/0/1:3 (597 MHz) initial 0 0 0 0
In8/0/1:3/U0 initial 0 0 0 0
In8/0/1:3/U1 initial 0 0 0 0
In8/0/1:3/U2 initial 0 0 0 0
In8/0/1:3/U3 up 0 0 0 0
In8/0/1:3/U4 down 0 0 0 0
In8/0/1:3/U5 down 0 0 0 0
In8/0/1:3/U6 down 0 0 0 0
In8/0/1:3/U7 down 0 0 0 0
Mo1/0/0:4 (525 MHz) up 0 0 0 0
Mo1/0/0:4/U0 down 0 0 0 0
Mo1/0/0:4/U1 down 0 0 0 0
Mo1/0/0:4/U2 down 0 0 0 0
Mo1/0/0:4/U3 down 0 0 0 0
Mo1/0/0:4/U4 up 0 0 0 0
Mo1/0/0:4/U5 up 0 0 0 0
Mo1/0/0:4/U6 up 0 0 0 0
Mo1/0/0:4/U7 initial 0 0 0 0
Mo1/0/0:5 (531 MHz) initial 0 0 0 0
Mo1/0/0:5/U0 down 0 0 0 0
Mo1/0/0:5/U1 down 0 0 0 0
Mo1/0/0:5/U2 down 0 0 0 0
Mo1/0/0:5/U3 down 0 0 0 0
Mo1/0/0:5/U4 up 0 0 0 0
Mo1/0/0:5/U5 up 0 0 0 0
Mo1/0/0:5/U6 up 0 0 0 0
Mo1/0/0:5/U7 initial 0 0 0 0
Mo1/0/0:6 (537 MHz) up 0 0 0 0
Mo1/0/0:6/U0 down 0 0 0 0
Mo1/0/0:6/U1 down 0 0 0 0
Mo1/0/0:6/U2 down 0 0 0 0
Mo1/0/0:6/U3 down 0 0 0 0
Mo1/0/0:6/U4 up 0 0 0 0
Mo1/0/0:6/U5 up 0 0 0 0
Mo1/0/0:6/U6 up 0 0 0 0
Mo1/0/0:6/U7 initial 0 0 0 0
Mo1/0/0:7 (543 MHz) initial 0 0 0 0
Mo1/0/0:7/U0 down 0 0 0 0
Mo1/0/0:7/U1 down 0 0 0 0
Mo1/0/0:7/U2 down 0 0 0 0
Mo1/0/0:7/U3 down 0 0 0 0
Mo1/0/0:7/U4 up 0 0 0 0
Mo1/0/0:7/U5 up 0 0 0 0
Mo1/0/0:7/U6 up 0 0 0 0
Mo1/0/0:7/U7 initial 0 0 0 0

```

Pending:

| Modem | Grp Idx | Primary | RF/RCC | MD/TCS | Action | Active | Retries |
|-------|---------|---------|--------|--------|--------|--------|---------|
|       |         | Src     | Target | Src    | Target | Time   |         |

```

001c.ea37.9aa0 81 Mo1/0/0:2/1 Mo1/0/0:1/0 60/1 60/1 REINIT 02:05 0 DOCSIS
3.0 LB
001c.ea37.9b5e 81 Cable7/0/0/1 Mo1/0/0:1/0 60/4 60/8 REINIT 02:12 0 DOCSIS
3.0 LB
001c.ea37.9bb0 81 Cable7/0/0/2 Mo1/0/0:2/0 60/2 60/2 REINIT 02:17 0 DOCSIS
3.0 LB

```

The following is a sample output of the **show cable load-balance docsis-group vdoc** command:

```
Router# show cable load-balance docsis-group 1 vdoc
```

| Target interface     | State | Group Index | Util | Total Targeted | IGMP Rep | CIR Init | High Util | Low CIR |
|----------------------|-------|-------------|------|----------------|----------|----------|-----------|---------|
| Cable7/0/0 (531 MHz) | down  | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |
| Mo3/0/0:0 (453 MHz)  | up    | 81          | 0    | 9(5)           | 7(5)     | 2(0)     | 0         | 0       |
| Mo3/0/0:1 (459 MHz)  | initi | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |
| Mo3/0/0:10 (513 MHz) | initi | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |
| Mo3/0/0:11 (519 MHz) | initi | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |
| Mo3/0/0:2 (465 MHz)  | initi | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |
| Mo3/0/0:3 (471 MHz)  | initi | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |
| Mo3/0/0:4 (477 MHz)  | initi | 81          | 0    | 5(0)           | 0(0)     | 5(0)     | 0         | 0       |
| Mo3/0/0:5 (483 MHz)  | up    | 81          | 0    | 7(7)           | 7(7)     | 0(0)     | 0         | 0       |
| Mo3/0/0:6 (489 MHz)  | initi | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |
| Mo3/0/0:7 (495 MHz)  | initi | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |
| Mo3/0/0:8 (501 MHz)  | initi | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |
| Mo3/0/0:9 (507 MHz)  | initi | 81          | 0    | 0(0)           | 0(0)     | 0(0)     | 0         | 0       |

The following example shows the output of the **show cable load-balance docsis-group docsis-group-id** with the **primary-load** command:

```
Router#show cable load-balance docsis-group fn 2 md c7/0/0 primary-load
```

| MD      | RCC-ID | Interface | In-RCC | State   | Pending | NBCM | WBCM | Weight |
|---------|--------|-----------|--------|---------|---------|------|------|--------|
| Ca7/0/0 | 1      | Mo7/0/0:0 | Y      | up      | 0       | 0    | 0    | 24.9   |
| Ca7/0/0 | 1      | Mo7/0/0:1 | Y      | initial | 0       | 0    | 0    | 24.9   |
| Ca7/0/0 | 1      | Mo7/0/0:2 | Y      | up      | 0       | 0    | 0    | 24.9   |
| Ca7/0/0 | 1      | Mo7/0/0:3 | Y      | initial | 0       | 0    | 0    | 24.9   |

Table 82 describes the fields shown in the **show cable load-balance docsis-group** display.

**Table 82** *show cable load-balance docsis-group – Field Description*

| Field                                                | Description                                                                                                                                                                                                                                                        |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fields for the Default Display and all Option</b> |                                                                                                                                                                                                                                                                    |
| DOCSIS Group                                         | Current number of DOCSIS groups created on the CMTS.                                                                                                                                                                                                               |
| Group Index                                          | Number of the load balancing group to which the cable interface has been assigned.                                                                                                                                                                                 |
| Status                                               | Information about the DOCSIS LBG: <ul style="list-style-type: none"> <li>• R—Restricted load balancing group (RLBG).</li> <li>• G—General load balancing group (GLBG).</li> <li>• E—The DOCSIS LBG is enabled.</li> <li>• D—The DOCSIS LBG is disabled.</li> </ul> |

**Table 82** *show cable load-balance docsis-group – Field Description (continued)*

| Field        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interval     | <p>Minimum time period configured when cable modems can be moved to load balance the interfaces.</p> <p>In Cisco IOS Release 12.2(33)SCE and earlier releases, the valid range is 1 to 1000 seconds, with a default value of 10. In Cisco IOS Release 12.2(33)SCE1 and later releases, the default value of <i>interval</i> is 30.</p>                                                                                                                                                                                                   |
| DCC mask/UCC | <p>Downstream and upstream channel change masks associated with the DOCSIS group.</p> <p>For example, in the output '0x40(1)/Y', '0x40' indicates that the user configured the dynamic channel change (DCC) technique 1 for the DOCSIS LBG. Similarly, '0x80' indicates configured DCC technique 0 and '0x20' indicates configured DCC technique 2. '(1)' indicates the DCC technique 1 is used to move the cable modem (CM). 'Y' indicates that load balancing sends upstream channel change (UCC) for movement of US channel only.</p> |
| Policy       | DOCSIS policy associated with the load balancing group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Method       | <p>Load balancing method used for the load balancing group. The following indicates what method is used for DS and US modems:</p> <ul style="list-style-type: none"> <li>• m = modem<br/>Uses the number of active cable modems on an interface.</li> <li>• s = service flow<br/>Uses the number of active Service Flow IDs (SFIDs) on an interface.</li> <li>• u = utilization<br/>Uses the current percent of utilization of an interface.</li> </ul>                                                                                  |



**Table 82** *show cable load-balance docsis-group – Field Description (continued)*

| Field     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Threshold | <p>Thresholds configured for this load balancing group:</p> <ul style="list-style-type: none"> <li>• <b>M = Minimum</b><br/>Minimum difference in the number of cable modems or service flows that can exist on two interfaces in the group before cable modems are moved between the interfaces. If the imbalance between interfaces is below this value, cable modems are not moved. This field contains a value only when the group is configured for the modems or service flows method of load balancing. (This value is configured using the <b>load minimum</b> option of the <b>cable load-balance group threshold</b> command.)</li> <li>• <b>S = Stability.</b><br/>Minimum allowable percentage of good periodic ranging requests that is acceptable. When the channel has a lower percent of modems responding to the ranging requests in a one minute period, the Cisco CMTS begins moving modems. The valid range is 0 to 100 percent, with a default of 50 percent.</li> <li>• <b>E = Enforce</b><br/>Minimum difference in the percentage of total load that must exist between interfaces in a load balancing group before the Cisco CMTS performs dynamic load balancing and begins moving cable modems that are currently online. When the difference in load between two interfaces falls below this value, the CMTS stops dynamic load balancing and performs static load balancing. (This value is configured using the <b>enforce</b> option of the <b>cable load-balance group threshold</b> command.)</li> <li>• <b>U = Ugs</b><br/>Percentage of the bandwidth that is allocated for Unsolicited Grant Services (UGS) traffic, such as Voice-over-IP (VoIP), that is in use on an interface because the CMTS moves cable modems that are online with active UGS service flows. (This value is configured using the <b>ugs</b> option of the <b>cable load-balance group threshold</b> command.)</li> <li>• <b>P = PacketCable MultiMedia (PCMM)</b><br/>Percentage of the reserved bandwidth threshold. Above this level, cable modems with active PCMM service flows participate in load balancing. The default threshold is 70%.</li> </ul> |
| Interface | Cable interface (downstream or upstream) that belongs to a load balancing group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**Table 82** *show cable load-balance docsis-group – Field Description (continued)*

| Field       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Utilization | <p>Long-term average of the upstream utilization. Displays the current load usage of the cable interface expressed as a percentage of the total bandwidth. For upstreams, this field shows a single percentage value, which is the average percentage of bandwidth being used on the upstream.</p> <p>For downstreams, this field shows a set of three percentage values:</p> <ul style="list-style-type: none"><li>• The percentage shows the load usage for the entire interface.</li><li>• The first percentage, within the parentheses, shows the load for the downstream.</li><li>• The second percentage, within the parentheses, shows the average load for all upstreams on the downstream.</li></ul> <p>For example, if this field shows “18% (18%/12%)”, it indicates that downstream and upstream channels on the interface are running on an average load of 18 percent. The downstream is running on an average load of 18 percent and all upstreams for this downstream are running on an average load of 12 percent.</p> <p><b>Note</b> To view the short-term average of the utilization, use the <b>show interface cable mac-scheduler</b> command.</p> |

**Table 82** *show cable load-balance docsis-group – Field Description (continued)*

| Field    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| State    | <p>Current state of the cable interface.</p> <p>The following states indicate normal operational states, depending on the configuration:</p> <ul style="list-style-type: none"> <li>• down—Interface is shut down. The CMTS cannot use the interface for load balancing in this state.</li> <li>• initial—Interface is currently in the initialization phase. The CMTS uses the interface for load balancing after the initialization completes.</li> <li>• up—Interface is up and passing traffic. The CMTS actively uses the interface for load balancing.</li> <li>• testing—Interface is currently under a load balancing test. The CMTS is unable to use the interface for normal load balancing operations until the test completes.</li> </ul> <p>The following states indicate abnormal states. The CMTS does not use interfaces in these states for load balancing operations, but continues to monitor and update the status every time the CMTS polls the interfaces for their current load usage:</p> <ul style="list-style-type: none"> <li>• suspicious—Interface is in an unknown state. The interface might be up and passing traffic, but is not consistent enough to support load balancing operations. The CMTS attempts to reinitialize the interface after a time-out period. If the interface has failed initialization more than 10 times, the CMTS moves the interface to the disabled state.</li> <li>• disabled—Interface has been disabled because a load balancing test is in-progress or because the interface reinitialization failed after 10 attempts.</li> <li>• unstable—Interface has failed repeated initialization attempts. The CMTS will attempt to reinitialize the interface after a time-out period. If a load balance test is not in-progress and if reinitialization fails, the CMTS moves it to the unstable state.</li> </ul> |
| Reserved | Percentage of bandwidth that is currently reserved by unsolicited grant service (UGS) service flows.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Modems   | Number of cable modems currently online on this cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Flows    | Number of service flows currently active on the cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 82** *show cable load-balance docsis-group – Field Description (continued)*

| Field                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weight                                             | Interface bandwidth, in megabits per second (mbps), for the downstream or upstream. The system uses this value in calculating whether the loads on the interfaces are balanced. Changing a channel parameter, such as modulation profile or channel width, affects the channel bandwidth and weight value.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Additional Fields for the target Option</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Interface                                          | <p>Source downstream or upstream interface that is part of a cable load balancing group. If the target field contains a value, it indicates that the source interface is currently oversubscribed.</p> <p>To reduce the cable load, the CMTS moves cable modems from the source interface to the target interface.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Target                                             | <p>Downstream or upstream interface to which cable modems on the source interface are being moved as part of load balancing operations. This field indicates the following:</p> <ul style="list-style-type: none"> <li>• If it is a downstream interface, the display shows the center frequency of the downstream within parentheses.</li> <li>• If only a frequency is shown, it indicates that the CMTS is moving cable modems to a different center frequency on the same downstream interface.</li> <li>• When the display includes the words “enforce”, it indicates that the CMTS is performing dynamic load balancing on the interfaces.</li> <li>• If this field is blank, it indicates that the source interface is not oversubscribed.</li> </ul> |
| <b>Additional Fields for the statistics Option</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Target interface                                   | Downstream or upstream interface. If this is a downstream interface, the display shows the center frequency of the downstream within parentheses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 82** *show cable load-balance docsis-group – Field Description (continued)*

| Field                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transfers                                       | <p>The following information is tracked for the indicated target interface:</p> <ul style="list-style-type: none"> <li>complete—Number of cable modems successfully moved to the target interface.</li> <li>pending—Number of cable modems in the process of being moved to the target interface.</li> <li>retries—Number of times that the CMTS unsuccessfully tried to move the same cable modem to the target interface. This occurs when one or more MAC layer messages to the cable modem are dropped due to radio frequency (RF) noise or because the modem is not DOCSIS-compliant. If the number of retries exceeds five for a particular cable modem, the CMTS counts this as a failure.</li> <li>failures—Number of times that the CMTS exceeded the maximum number of allowable retries (5) when trying to move a particular cable modem to the target interface. A large number of failures could indicate one or more possible problems: <ul style="list-style-type: none"> <li>The specific cable modems are not DOCSIS-compliant.</li> <li>One or both interfaces are having problems passing traffic.</li> <li>One or both interfaces are having persistent RF noise problems.</li> <li>The source and target interfaces are not combined in the same node and do not share the same physical connectivity (which is required when interfaces are part the same load balancing group).</li> </ul> </li> </ul> |
| <b>Additional Fields for the pending Option</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Modem                                           | Hardware (MAC) address of the cable modem that is moved as part of load balancing operations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Source interface                                | Downstream or upstream cable interface on which the cable modem is currently online.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Target interface                                | Downstream or upstream cable interface to which the CMTS is trying to move the cable modem to load balance the interfaces in this load balancing group. If the CMTS is moving the cable modem to a different frequency on the same downstream interface, this field shows only the new center frequency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Retries                                         | Number of times that the CMTS has attempted to move this cable modem to the target interface. The CMTS attempts to move the cable modem 5 times before counting this load balancing move as a failure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**Table 82** *show cable load-balance docsis-group – Field Description (continued)*

| Field                                                | Description                                                                                       |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>Additional Fields for the modem-list option</b>   |                                                                                                   |
| US                                                   | Upstream channels in the DOCSIS LBG.                                                              |
| MAC Address                                          | Total number (in parentheses) and MAC addresses of the modems connected to the upstream channels. |
| <b>Additional fields for the primary-load option</b> |                                                                                                   |
| MD                                                   | MAC Domain.                                                                                       |
| RCC-ID                                               | RCC index per MAC domain.                                                                         |
| Pending                                              | Number of pending modems on the channel.                                                          |

**Related Features**

| Command                                 | Description                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------|
| <b>cable load-balance docsis-group</b>  | Creates a DOCSIS LBG on the Cisco CMTS.                                          |
| <b>cable load-balance docsis-policy</b> | Creates a DOCSIS policy and associates an existing rule and tag with the policy. |
| <b>cable load-balance docsis-enable</b> | Enables or disables DOCSIS load balancing on the Cisco CMTS.                     |
| <b>cable load-balance rule</b>          | Creates a rule to prevent the CM from disabling or enabling load balancing.      |
| <b>cable tag</b>                        | Creates a tag to associate it with DOCSIS policies and groups.                   |

# show cable logging

To display the log of messages about bad IP source addresses, downstream indexes, on the cable interfaces, use the **show cable logging** command in user EXEC or privileged EXEC mode.

**show cable logging** [**badipsource** | | **summary**] [*slot*]

## Syntax Description

|                    |                                                                                                                                                                        |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>badipsource</b> | Displays the contents of the error log buffer containing the error messages for bad IP source addresses.                                                               |
|                    | Displays the contents of the message log buffer for downstream indexes.                                                                                                |
| <b>summary</b>     | Displays the status of the logging feature and its buffer.                                                                                                             |
| <i>slot</i>        | (Optional) Slot of a particular cable interface on the Cisco uBR7200 series router. The <i>slot</i> parameter can range from 3 to 6, depending on the cable interface. |
| <b>Note</b>        | This option is supported only on the Cisco uBR-MC16U/X, Cisco uBR10-MC5X20U, Cisco uBR10-MC5X20H, and Cisco uBR-MC28U/X cable interface line card.                     |

## Command Modes

User EXEC (>)  
Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                                            |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(13)EC  | This command was introduced for the Cisco uBR7100 series and Cisco uBR7200 series universal broadband routers.                                                                                          |
| 12.2(11)CY  | Support was added for the Cisco uBR10012 universal broadband router.                                                                                                                                    |
| 12.2(11)BC2 | Support was added to the Release 12.2 BC train for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers.                                                                          |
| 12.2(15)CX  | Support was added to display the log buffer on an individual Cisco uBR-MC28U/X cable interface line card on the Cisco uBR7200 series router.                                                            |
| 12.2(15)BC2 | Support was added for the Cisco uBR-MC16U/X, Cisco uBR10-MC5X20U, and Cisco uBR10-MC5X20H cable interface line cards.                                                                                   |
| 12.3(21)BC  | This command was enhanced to support logging events tracked with the Cable Duplicate MAC Address Reject feature on the Cisco CMTS, when configured. This supports the detection of cloned cable modems. |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                      |
| 12.3(23)BC5 | The command output was modified to display the CPU revision number of the line card.                                                                                                                    |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB.                                                                                                                                         |
| 12.2(33)SCG | The                                                                                                                                                                                                     |

**Usage Guidelines**

For additional information about the Cable Duplicate MAC Address Reject feature on the Cisco CMTS, or enforced DOCSIS 1.1 security, see the *Cable Duplicate MAC Address Reject for the Cisco CMTS*.

The **cable logging badipsource** command creates a circular buffer that contains the BADIPSOURCE error messages, which the Cisco CMTS generates when it discovers a CM or CPE device using an unauthorized IP address. If the buffer becomes full, the oldest messages are deleted to make room for the newer messages.

Use the **show cable logging** command to display the current contents of the buffer. After you have viewed all of the error messages in the current buffer, use the **clear cable logging** command to clear out the buffer to make room for newer messages.

Use the **show cable logging summary** command to check if the logging feature is enabled and also to view the status of the logging buffer.

The Broadband Processing Engine (BPE) cable interface line cards (such as the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X) contain an onboard processor that also maintains its own log buffer. To display the contents of this log, add the card slot number after the **show cable logging** command.

**Examples**

The following is a sample output of the **show cable logging badipsource** command. The oldest messages are displayed first.

```
Router# show cable logging badipsource
```

```
00:01:19: %UBR10000-3-BADIPSOURCE: Interface Cable6/1/1, IP packet from invalid source.
IP=10.44.50.13, MAC=0050.0f02.1d15, Expected SID=1, Actual SID=1
00:01:26: %UBR10000-3-BADIPSOURCE: Interface Cable6/1/1, IP packet from invalid source.
IP=10.44.50.13, MAC=0050.0f02.1d15, Expected SID=1, Actual SID=1
01:49:33: %UBR10000-3-BADIPSOURCE: Interface Cable6/1/0, IP packet from invalid source.
IP=0.0.0.44, MAC=0030.eb00.029d, Expected Interface=Cable6/1/0 SID=2833
02:12:03: %UBR10000-3-BADIPSOURCE: Interface Cable6/1/0, IP packet from invalid source.
IP=0.0.0.44, MAC=0030.eb15.73bd, Expected Interface=Cable6/1/0 SID=2800
02:12:43: %UBR10000-3-BADIPSOURCE: Interface Cable6/1/0, IP packet from invalid source.
IP=0.0.0.44, MAC=00e0.ca01.287a, Expected Interface=Cable6/1/0 SID=3299
02:22:50: %UBR10000-3-BADIPSOURCE: Interface Cable6/1/0, IP packet from invalid source.
IP=0.0.0.44, MAC=0030.eb00.02a2, Expected Interface=Cable6/1/0 SID=394
```

The following is a sample output of the **show cable logging badipsource** command when logging has not been enabled with the **cable logging badipsource** command:

```
Router# show cable logging badipsource
```

```
Cable logging: BADIPSOURCE Disabled
```

The following is a sample output for the **downstream-index** option, showing whether logging is enabled, the total size of the buffer, how many bytes are currently used, and how many error messages have been logged since the buffer was last cleared.

```
Router# show cable logging summary
```

```
Cable logging: Enabled
Total buffer size (bytes): 1000000
Used buffer size (bytes) : 36968
Logged messages : 231
```

The following is a sample output for the **summary** option, showing whether logging is enabled, the total size of the buffer, how many bytes are currently used, and how many error messages have been logged since the buffer was last cleared.

```
Router# show cable logging summary
```



```

Cable logging: BADIPSOURCE Enabled
 Total buffer size (bytes): 1000000
 Used buffer size (bytes) : 36968
 Logged messages : 231

```

The following is a sample output for the **summary** option, indicating the CPU revision number of the line card. The display given below is specific to the uBR7200 series routers.

```
Router# show cable logging summary slot 6
```

```

Current LC State Info for slot 6
CLC CPU: BCM1250(Rev A8/A10)
 - Status - NO NPE/CLC OIR Timeout detected
Last Process Executed = Per-minute Jobs (4 ms count = 0ms)
Intr Busy Count = 0
Sched Flag Count = 2076
Status = 0x0
Late Poll Etime = 0
LC IPC Reply Status = 0
Interrupted PC/Level Trace
60475E5C/0x0 60475D98/0x0 60406D60/0x0 60406D70/0x0
604754E4/0x0 60335188/0x0 60406D38/0x0 60475E50/0x0
604761DC/0x0 60406D70/0x0 604761DC/0x0 60476994/0x0
60407810/0x0 6047101C/0x0 60470EFC/0x0 60475E5C/0x0
604759C0/0x0 60471014/0x0 60337F04/0x0 60406D4C/0x0
60475E50/0x0 60473EB0/0x0 60475E54/0x0 60476150/0x0
604761D4/0x0 604756FC/0x0 60407810/0x0 60337F80/0x0
60335230/0x0 60475E94/0x0 60406D60/0x0 604756FC/0x0
604761DC/0x0 60475694/0x0 60406CD4/0x0 60470EF0/0x0
60475DBC/0x0 60406D38/0x0 60476954/0x0 604077D0/0x0
60406CDC/0x0 60406CE0/0x0 609FA0C0/0x0 60470EFC/0x0
604754DC/0x0 604077F0/0x0 60475E1C/0x0 60471018/0x0
60337F58/0x0 60406D38/0x0 60475694/0x0 60475E3C/0x0
60406D68/0x0 60337F50/0x0 60470EF0/0x0 60406D60/0x0
604756A8/0x0 60406D38/0x0 60475DC4/0x0 60406D48/0x0

```

```

Cable logging: BADIPSOURCE Disabled Slot 6
Cable logging: LAYER2EVENTS Disabled Slot 6
Cable logging: OVERLAPIP Disabled Slot 6

```

## Related Commands

|                                       |                                                                                            |
|---------------------------------------|--------------------------------------------------------------------------------------------|
| <b>cable logging badipsource</b>      | Logs error messages about bad IP source addresses on the cable interfaces.                 |
| <b>cable logging downstream-index</b> | Logs messages about the downstream indexes.                                                |
| <b>cable source-verify</b>            | Enables verification of IP addresses for CMs and CPE devices on the upstream.              |
| <b>clear cable logging</b>            | Removes all error and buffer messages on the cable interfaces from the corresponding logs. |





# Cable Commands: show cable m through show cable u

Revised: August 12, 2013, OL-15510-17

## New Commands

| Command                                   | Cisco IOS Software Release |
|-------------------------------------------|----------------------------|
| show cable mac-domain cable forwarding    | 12.3(23)BC                 |
| show cable mac-domain cgd-associations    | 12.3(23)BC                 |
| show cable modem domain-name              | 12.2(33)SCA                |
| show cable modem ipv6                     | 12.2(33)SCA                |
| show cable modem voice                    | 12.3(23)BC                 |
| show cable modem primary-channel          | 12.3(23)BC                 |
| show cable modem type                     | 12.2(33)SCA                |
| show cable modem wideband primary-channel | 12.3(23)BC                 |
| show cable rate-adapt                     | 12.3(23)BC2                |
| show cable service-voice downstream-type  | 12.3(23)BC                 |
| show cable mac-domain rcc                 | 12.2(33)SCB                |
| show cable rf-status                      | 12.2(33)SCB                |
| show cable rsvp flow-db                   | 12.2(33)SCB                |
| show cable modem auth-profile             | 12.2(33)SCB                |
| show cable modem service-type-id          | 12.2(33)SCB                |
| show cable modem summary wb-rf            | 12.2(33)SCB                |
| show cable modem wideband rcs-status      | 12.2(33)SCB                |
| show cable multicast authorization        | 12.2(33)SCB                |
| show cable multicast db                   | 12.2(33)SCB                |
| show cable multicast dsid                 | 12.2(33)SCB                |
| show cable multicast qos                  | 12.2(33)SCB                |
| show cable modem service-flow             | 12.2(33)SCB1               |

| Command                                      | Cisco IOS Software Release |
|----------------------------------------------|----------------------------|
| show cable mac-domain upstream-service-group | 12.2(33)SCC                |
| show cable rate-limit-ccf                    | 12.2(33)SCC                |
| show cable signal-quality                    | 12.2(33)SCC                |
| show cable spectrum-analysis                 | 12.2(33)SCC                |
| show cable us-sg                             | 12.2(33)SCC                |
| show cable modem partial-mode                | 12.2(33)SCD2               |
| show cable multicast debug                   | 12.2(33)SCE                |
| show cable urm                               | 12.2(33)SCE                |
| show cable modem rf-adapt                    | 12.2(33)SCF                |
| show cable multicast statistics failure      | 12.2(33)SCF                |
| show cable rf-adapt                          | 12.2(33)SCF                |
| show cable modem extended-power              | 12.2(33)SCF2               |
| show cable throttle-modem                    | 12.2(33)SCF3               |
| show cable modem partial-service             | 12.2(33)SCG                |
| show cable modem resiliency                  | 12.2(33)SCG                |
| show cable modem tcs summary                 | 12.2(33)SCG                |
| show cable modem wideband phy                | 12.2(33)SCG                |
| show cable resiliency                        | 12.2(33)SCG                |
| show cable upstream service-flow summary     | 12.2(33)SCG                |
| show cable modem sysDescr                    | 12.2(33)SCG2               |
| show cable multicast ses-cache               | 12.2(33)SCH                |

#### Modified Commands

| Command                                        | Cisco IOS Software Release |
|------------------------------------------------|----------------------------|
| show cable mac-domain downstream-service-group | 12.3(23)BC                 |
| show cable modem                               | 12.3(23)BC, 12.2(33)SCA    |
| show cable modem calls                         | 12.2(33)SCA                |
| show cable modem classifiers                   | 12.2(33)SCA                |
| show cable modem cnr                           | 12.2(33)SCA                |
| show cable modem connectivity                  | 12.2(33)SCA                |
| show cable modem counters                      | 12.2(33)SCA                |
| show cable modem cpe                           | 12.2(33)SCA                |
| show cable modem docsis device-class           | 12.2(33)SCA                |
| show cable modem errors                        | 12.2(33)SCA                |
| show cable modem flap                          | 12.2(33)SCA                |

| Command                                        | Cisco IOS Software Release |
|------------------------------------------------|----------------------------|
| show cable modem mac                           | 12.2(33)SCA                |
| show cable modem maintenance                   | 12.2(33)SCA                |
| show cable modem offline                       | 12.2(33)SCA                |
| show cable modem phy                           | 12.2(33)SCA                |
| show cable modem qos                           | 12.2(33)SCA                |
| show cable modem registered                    | 12.2(33)SCA                |
| show cable modem rogue                         | 12.2(33)SCA                |
| show cable modem remote-query                  | 12.3(23)BC                 |
| show cable modem phy                           | 12.2(33)SCA                |
| show cable modem                               | 12.2(33)SCB                |
| show cable mac-domain cgd-associations         | 12.2(33)SCB                |
| show cable mac-domain downstream-service-group | 12.2(33)SCB                |
| show cable modem wideband                      | 12.2(33)SCB                |
| show cable modem wideband rcs-status           | 12.2(33)SCB                |
| show cable qos enforce-rule                    | 12.2(33)SCB                |
| show cable rate-adapt                          | 12.2(33)SCB                |
| show cable modem service-flow                  | 12.3(23)BC7                |
| show cable modem                               | 12.2(33)SCC                |
| show cable modem cnr                           | 12.2(33)SCC                |
| show cable modem flap                          | 12.2(33)SCC                |
| show cable modem phy                           | 12.2(33)SCC                |
| show cable modem qos                           | 12.2(33)SCC                |
| show cable multicast dsid                      | 12.2(33)SCC                |
| show cable service-class                       | 12.2(33)SCC                |
| show cable mac-domain downstream-service-group | 12.2(33)SCD                |
| show cable mac-domain cgd-associations         | 12.2(33)SCD                |
| show cable mac-domain rcc                      | 12.2(33)SCD                |
| show cable modem                               | 12.2(33)SCD                |
| show cable multicast dsid                      | 12.2(33)SCD                |
| show cable modem                               | 12.2(33)SCD2               |
| show cable modem docsis version                | 12.2(33)SCD2               |
| show cable qos enforce-rule                    | 12.2(33)SCD2               |
| show cable modem service-flow                  | 12.2(33)SCE                |
| show cable multicast db                        | 12.2(33)SCE                |
| show cable multicast qos                       | 12.2(33)SCE                |
| show cable privacy                             | 12.2(33)SCE                |

| Command                                        | Cisco IOS Software Release |
|------------------------------------------------|----------------------------|
| show cable mac-domain cable forwarding         | 12.2(33)SCF                |
| show cable modem                               | 12.2(33)SCF                |
| show cable modem access-group                  | 12.2(33)SCF                |
| show cable modem calls                         | 12.2(33)SCF                |
| show cable modem cnr                           | 12.2(33)SCF                |
| show cable modem connectivity                  | 12.2(33)SCF                |
| show cable modem counters                      | 12.2(33)SCF                |
| show cable modem docsis version                | 12.2(33)SCF                |
| show cable modem domain-name                   | 12.2(33)SCF                |
| show cable modem errors                        | 12.2(33)SCF                |
| show cable modem flap                          | 12.2(33)SCF                |
| show cable modem ipv6                          | 12.2(33)SCF                |
| show cable modem mac                           | 12.2(33)SCF                |
| show cable modem maintenance                   | 12.2(33)SCF                |
| show cable modem offline                       | 12.2(33)SCF                |
| show cable modem phy                           | 12.2(33)SCF                |
| show cable modem primary channel               | 12.2(33)SCF                |
| show cable modem qos service-class             | 12.2(33)SCF                |
| show cable modem registered                    | 12.2(33)SCF                |
| show cable modem rogue                         | 12.2(33)SCF                |
| show cable modem summary                       | 12.2(33)SCF                |
| show cable modem type                          | 12.2(33)SCF                |
| show cable modem unregistered                  | 12.2(33)SCF                |
| show cable modem vendor                        | 12.2(33)SCF                |
| show cable modem wideband                      | 12.2(33)SCF                |
| show cable multicast db                        | 12.2(33)SCF                |
| show cable modem                               | 12.2(33)SCE4               |
| show cable modem service-flow                  | 12.2(33)SCF2               |
| show cable service-class                       | 12.2(33)SCF2               |
| show cable mac-domain cgd-associations         | 12.2(33)SCG                |
| show cable mac-domain downstream-service-group | 12.2(33)SCG                |
| show cable modem qos                           | 12.2(33)SCG                |
| show cable modem wideband                      | 12.2(33)SCG                |
| show cable modem                               | 12.2(33)SCH                |
| show cable modem                               | 12.2(33)SCG5               |
| show cable modem                               | 12.2(33)SCH1               |

# show cable mac-domain cable forwarding

To display all the interfaces (wideband and modular) and statistics belonging to the Mac domain, use the **show cable mac-domain cable forwarding** command in privileged EXEC mode.

**show cable mac-domain cable *slot/subslot/port* forwarding**

|                           |                   |                                                                                                  |
|---------------------------|-------------------|--------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>slot</i>       | Specifies the chassis slot number of the cable interface line card. Valid values are 5 to 8.     |
|                           | <i>subslot</i>    | Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1. |
|                           | <i>port</i>       | Specifies the port number. Valid values are 0 to 4 (depending on the cable interface).           |
|                           | <b>forwarding</b> | Displays the forwarding statistics for the cable line cards.                                     |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC (#)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                          |
|------------------------|----------------|--------------------------------------------------------------|
|                        | 12.3(23)BC     | This command was introduced.                                 |
|                        | 12.2(33)SCA    | This command is integrated in Cisco IOS Release 12.2(33)SCA. |

**Usage Guidelines** The **show cable mac-domain cable forwarding** command does not support wideband and modular interfaces. However, if wideband and modular interfaces belong to the Mac domain, the interfaces are listed in the output with the interface state.

Starting with Cisco IOS Release 12.2(33)SCF, for a chassis loaded with the UBR-MC20X20V or uBR-MC3GX60V line cards, and legacy uBR-MC5X20 line cards, the **show cable mac-domain cable forwarding** command shall not display the legacy downstream information for the UBR-MC20X20V and the uBR-MC3GX60V line cards.

**Examples** The following is sample output of the **show cable mac-domain cable forwarding** command on the cable interface at 8/0/0:

Router# **show cable mac-domain cable 8/0/0 forwarding**

| Interface Name | Output<br>Packets      Rate<br>(bytes)      (bits/sec) |   | Interface Bandwidth<br>(Kbps) | Reserved/<br>Reservable<br>Bandwidth | Interface State |
|----------------|--------------------------------------------------------|---|-------------------------------|--------------------------------------|-----------------|
| Ca8/0/0        | 201358                                                 | 0 | 26000                         | 6500/19500                           | UP              |
| Mo1/0/0:0      | 344340                                                 | 0 | 4160                          | 1040/3120                            | UP              |
| Mo1/0/0:1      | 252132                                                 | 0 | 7800                          | 1950/5850                            | UP              |
| Mo1/0/0:2      | 252132                                                 | 0 | 7800                          | 1950/5850                            | UP              |

**show cable mac-domain cable forwarding**

```
Wi1/0/0:0 198916 0 7803 1951/5852 UP
Wi1/0/0:1 1152 0 10404 2601/7803 UP
```

Table 159 describes the significant fields shown in the display.

**Table 83** *show cable mac-domain cable forwarding Field Descriptions*

| Field                         | Description                                        |
|-------------------------------|----------------------------------------------------|
| Interface Name                | The name of the interface belonging to Mac domain. |
| Output Packets/Rate           | The cumulative packets output and output rate.     |
| Interface Bandwidth           | The total interface bandwidth allocated.           |
| Reserved/Reservable Bandwidth | The total reserved and available bandwidth.        |
| Interface State               | Indicates whether the interface is up or down.     |



# show cable mac-domain cgd-associations

To display a summary of the Channel Grouping Domain (CGD) associations for all cable MAC domains, use the **show cable mac-domain cgd-associations** command in privileged EXEC mode.

## Cisco uBR10012 Router

**show cable mac-domain cable *slot/subslot/port* cgd-associations**

## Cisco uBR7225VXR and Cisco uBR7246VXR Routers

**show cable mac-domain cable *slot/port* cgd-associations**

| <b>Syntax Description</b>                | <table> <tr> <td><b>cable</b><br/><i>slot/subslot/port</i></td><td> Identifies the cable interface on the Cisco uBR10012 router. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. The valid range is from 5 to 8.</li> <li><i>subslot</i>—Subslot where the line card resides. Available slots are 0 or 1.</li> <li><i>port</i>—Downstream controller number on the line card. Valid port values are from 0 to 4.</li> </ul> </td></tr> <tr> <td><b>cable</b> <i>slot/port</i></td><td> Identifies the cable interface on the Cisco uBR7246VXR or Cisco uBR7225VXR router. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7246VXR router: The valid range is from 3 to 6.</li> <li>Cisco uBR7225VXR router: The valid range is from 1 to 2.</li> </ul> </li> <li><i>port</i>—Downstream port number on the line card. The valid port value is 0 or 1.</li> </ul> </td></tr> </table> | <b>cable</b><br><i>slot/subslot/port</i> | Identifies the cable interface on the Cisco uBR10012 router. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. The valid range is from 5 to 8.</li> <li><i>subslot</i>—Subslot where the line card resides. Available slots are 0 or 1.</li> <li><i>port</i>—Downstream controller number on the line card. Valid port values are from 0 to 4.</li> </ul> | <b>cable</b> <i>slot/port</i> | Identifies the cable interface on the Cisco uBR7246VXR or Cisco uBR7225VXR router. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7246VXR router: The valid range is from 3 to 6.</li> <li>Cisco uBR7225VXR router: The valid range is from 1 to 2.</li> </ul> </li> <li><i>port</i>—Downstream port number on the line card. The valid port value is 0 or 1.</li> </ul> |             |                                                                                                                                  |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b><br><i>slot/subslot/port</i> | Identifies the cable interface on the Cisco uBR10012 router. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. The valid range is from 5 to 8.</li> <li><i>subslot</i>—Subslot where the line card resides. Available slots are 0 or 1.</li> <li><i>port</i>—Downstream controller number on the line card. Valid port values are from 0 to 4.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |                                                                                                                                                                                                                                                                                                                                                                                              |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                                  |
| <b>cable</b> <i>slot/port</i>            | Identifies the cable interface on the Cisco uBR7246VXR or Cisco uBR7225VXR router. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7246VXR router: The valid range is from 3 to 6.</li> <li>Cisco uBR7225VXR router: The valid range is from 1 to 2.</li> </ul> </li> <li><i>port</i>—Downstream port number on the line card. The valid port value is 0 or 1.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |                                                                                                                                                                                                                                                                                                                                                                                              |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                                  |
| <b>Command Default</b>                   | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |                                                                                                                                                                                                                                                                                                                                                                                              |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                                  |
| <b>Command Modes</b>                     | Privileged EXEC (#)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |                                                                                                                                                                                                                                                                                                                                                                                              |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                                  |
| <b>Command History</b>                   | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>12.3(23)BC</td><td>This command was introduced for the Cisco uBR10012 router.</td></tr> <tr> <td>12.2(33)SCB</td><td>This command was integrated into Cisco IOS Release 12.2(33)SCB. Added support for Cisco uBR7246VXR and Cisco uBR7225VXR routers.</td></tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Release                                  | Modification                                                                                                                                                                                                                                                                                                                                                                                 | 12.3(23)BC                    | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                                                                                                                                                                                                                                                                     | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. Added support for Cisco uBR7246VXR and Cisco uBR7225VXR routers. |
| Release                                  | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |                                                                                                                                                                                                                                                                                                                                                                                              |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                                  |
| 12.3(23)BC                               | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |                                                                                                                                                                                                                                                                                                                                                                                              |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                                  |
| 12.2(33)SCB                              | This command was integrated into Cisco IOS Release 12.2(33)SCB. Added support for Cisco uBR7246VXR and Cisco uBR7225VXR routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                          |                                                                                                                                                                                                                                                                                                                                                                                              |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                                  |

**Usage Guidelines**

The **show cable mac-domain cgd-associations** command displays the following information for each cable MAC domain:

- Shared port adapter (SPA) downstream channels that have been added to each MAC domain.
- Upstream channels associated with each SPA downstream channel and the downstream channels of the integrated cable interface line card.

If the All column in the command output indicates Y, then this indicates that all upstream channels associated with the line card downstream channels or SPA downstream channels are configured using the **upstream cable connector** command. If all upstream channels are not configured, then this column will not be displayed.

- The SPA downstream channels that are currently active.

A SPA downstream channel is active when the corresponding modular cable interface, which represents the SPA downstream channel, and its line protocol are up. A SPA downstream channel that is considered active is an operational primary downstream channel in the cable MAC domain.

**Note**

For more information on Channel Grouping Domains, refer to the *Cisco DOCSIS 3.0 Downstream Solution Design and Implementation Guide, Release 2.0*.

**Examples****Cisco IOS Release 12.3(23)BC**

The following is a sample output of the **show cable mac-domain cgd-associations** command for the cable interface line card at slot 6, subslot 0, and port 0:

```
Router# show cable mac-domain cable 6/0/0 cgd-associations
```

| CGD Host | SPA   | DS Channels | Upstreams (All) | Active Remote DS |
|----------|-------|-------------|-----------------|------------------|
| Ca6/0/0  |       | Local       | 1               | Y                |
|          | 1/0/0 | 0-1         | 0               |                  |

**Cisco IOS Release 12.2(33)SCB**

The following is a sample output of the **show cable mac-domain cgd-associations** command for the cable interface line card at slot 7, subslot 0, and port 0:

```
Router# show cable mac-domain Cable7/0/0 cgd-associations
```

| CGD Host | Resource | DS Channels | Upstreams (AllUS) | Active Remote DS |
|----------|----------|-------------|-------------------|------------------|
| Ca7/0/0  | 7/0/0    | 0           | 0                 |                  |
|          | 3/1/0    | 0-2         | 0                 |                  |
|          |          |             |                   | 0-2              |

**Cisco IOS Release 12.2(33)SCG**

The following example is a sample output of the **show cable mac-domain cgd-associations** command for the Cisco uBR-MC3GX60V cable interface line card sharing downstreams with the Cisco Wideband SPA, in Cisco IOS Release 12.2(33)SCG:

```
Router# show cable mac-domain cable 8/0/0 cgd-associations
```

| CGD Host | Resource | DS Channels | Upstreams (AllUS) | Active Remote DS |
|----------|----------|-------------|-------------------|------------------|
| Ca8/0/0  | 1/1/0    | 0           | 0-3               | Yes              |

Table 84 describes the fields shown in the **show cable mac-domain cgd-associations** command display.

**Table 84** *show cable cgd-associations Field Descriptions*

| Field             | Description                           |
|-------------------|---------------------------------------|
| CGD Host          | MAC domain interface for CGD.         |
| Resource          | Downstream cable interface line card. |
| DS Channels       | Downstream RF channels.               |
| Upstreams (AllUS) | Upstream channels in the MAC domain.  |
| Active Remote DS  | Active downstream channels.           |

#### Related Commands

| Command                                               | Description                                                                                  |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>show cable mac-domain downstream-service-group</b> | Displays MAC Domain Downstream Service Group information for the primary downstream channel. |

# show cable mac-domain downstream-service-group

To display MAC Domain Downstream Service Group information for a primary downstream channel, use the **show cable mac-domain downstream-service-group** command in privileged EXEC mode.

## Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers

**show cable mac-domain cable *slot/port* downstream-service-group**

## Cisco uBR10012 Universal Broadband Router

**show cable mac-domain cable *slot/subslot/port* downstream-service-group**

| Syntax Description |                |                                                                                                                                                                                                                              |
|--------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>slot</i>    | Slot where the line card resides.<br><br>Cisco uBR7246VXR router—The valid range is from 3 to 6.<br><br>Cisco uBR7225VXR router—The valid range is from 1 to 2.<br><br>Cisco uBR10012 router—The valid range is from 5 to 8. |
|                    | <i>subslot</i> | The subslot used for the cable interface line card. Valid values are 0 or 1.                                                                                                                                                 |
|                    | <i>port</i>    | The downstream port used as a primary downstream channel. Valid values are from 0 to 4 (depending on the cable interface).                                                                                                   |

| Command Default | No default behavior or values |
|-----------------|-------------------------------|
|-----------------|-------------------------------|

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                                                                                                                                                        |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                          |
|                 | 12.3(23)BC  | This command displays the MAC Domain Downstream Service Group information for primary downstream channels from the SPA as well as the Cisco uBR10-MC5X20 line card. |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                     |
|                 | 12.2(33)SCD | This command was modified. Support was added for Cisco uBR7225VXR and Cisco uBR7246VXR routers.                                                                     |

| Usage Guidelines | <p>Use the <b>show cable mac-domain downstream-service-group</b> command to display MAC Domain Downstream Service Group (MD-DS-SG) information for the specified primary downstream channel.</p> <p>For each fiber node, a traditional DOCSIS downstream channel on a Cisco uBR10-MC5X20 cable interface line card is used to carry MAC management and signaling messages, and the associated traditional DOCSIS upstream channel is used for return data traffic and signaling. The traditional DOCSIS downstream channel used in this way for a MAC domain is called the <i>primary downstream channel</i>.</p> |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Note**

Beginning in Cisco IOS Release 12.3(23)BC, either an RF channel from the SPA or a Cisco uBR10-MC5X20 downstream channel can serve as a primary channel in a fiber node. Changes in Cisco IOS Release 12.3(23)BC apply to Cisco IOS Release 12.2(33)SCB but do not apply to Cisco IOS Release 12.2(33)SCA.

**Examples**

The following two examples display **show cable mac-domain downstream-service-group** output for the primary downstream channel on the cable interface at slot/subslot/port 5/0/0:

**Cisco IOS Release 12.3(21)BC**

```
Router# show cable mac-domain cable5/0/0 downstream-service-group
```

|         |          |             |
|---------|----------|-------------|
| Primary | MD-DS-SG | RF          |
| IF      | Id       | SPA Chan    |
| C5/0/0  | 1        | 1/0/0 0 - 1 |

**Cisco IOS Release 12.3(23)BC**

```
Router# show cable mac-domain cable5/0/0 downstream-service-group
```

|        |          |       |       |                           |
|--------|----------|-------|-------|---------------------------|
| Cable  | MD-DS-SG | RF    | Local | Remote                    |
| IF     | Id       | SPA   | Chan  | Primary Chan Primary Chan |
| C5/0/0 | 1        | 1/0/0 | 00-01 | Yes                       |

In the preceding examples, the MD-DS-SG with ID 1 is used for RF channels 0 and 1 on the Wideband SPA located in slot/subslot/bay 1/0/0.

**Cisco IOS Release 12.2(33)SCB**

The following example shows a sample output of the **show cable mac-domain downstream-service-group** command for the primary downstream channel on the cable interface at slot/subslot/port 7/0/0:

```
Router# show cable mac-domain Cable7/0/0 downstream-service-group
```

|        |          |                            |
|--------|----------|----------------------------|
| Cable  | MD-DS-SG | RF                         |
| IF     | Id       | Resource Chan Primary Chan |
| C7/0/0 | 1        | 3/1/0 00-02 0 1 2          |
|        |          | 7/0/0 00 0                 |

**Cisco IOS Release 12.2(33)SCD**

The following example shows a sample output of the **show cable mac-domain downstream-service-group** command for the primary downstream channel on the cable interface at slot/port 5/0:

```
Router# show cable mac-domain cable 5/0 downstream-service-group
```

|       |          |                            |
|-------|----------|----------------------------|
| Cable | MD-DS-SG | RF                         |
| IF    | Id       | Resource Chan Primary Chan |
| C5/0  | 1        | 5/0 00-03 0                |

## show cable mac-domain downstream-service-group

### Cisco IOS Release 12.2(33)SCG

The following example shows a sample output of the **show cable mac-domain downstream-service-group** command for the Cisco uBR-MC3GX60V cable interface line card with primary downstream channel hosted on the Cisco Wideband SPA, in Cisco IOS Release 12.2(33)SCG:

```
Router# show cable mac-domain cable 8/0/0 downstream-service-group
```

```
Cable MD-DS-SG RF
IF Id Resource Chan Primary Chan
C8/0/0 1 1/1/0 00-03 0
 1/3/0 00-03
 7/0/0 00-03
 8/0/2 00-03
```

[Table 85](#) describes the fields shown in the **show cable mac-domain downstream-service-group** command display.

**Table 85** *show cable mac-domain downstream-service-group Field Descriptions*

| Field        | Description                           |
|--------------|---------------------------------------|
| Cable IF     | Cable interface.                      |
| MD-DS-SG     | MAC Domain Downstream Service Group.  |
| Resource     | Downstream cable interface line card. |
| RF Chan      | Downstream RF channel.                |
| Primary Chan | Primary downstream channel.           |

#### Related Commands

| Command                          | Description                                                                                          |
|----------------------------------|------------------------------------------------------------------------------------------------------|
| <b>show cable modem</b>          | Displays information for registered and unregistered cable modems (including wideband cable modems). |
| <b>show cable modem wideband</b> | Displays information for registered and unregistered wideband cable modems.                          |

# show cable mac-domain rcc

To display runtime receive channel configuration (RCC) on a cable line card interface, use the **show cable mac-domain rcc** command in privileged EXEC mode.

## Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers

**show cable mac-domain cable slot/port rcc**

## Cisco uBR10012 Universal Broadband Router

**show cable mac-domain cable slot/subslot/port rcc**

| Syntax Description |                                                                                                  |  |
|--------------------|--------------------------------------------------------------------------------------------------|--|
| <i>slot</i>        | Slot where the line card resides.                                                                |  |
|                    | Cisco uBR7246VXR router—The valid range is from 3 to 6.                                          |  |
|                    | Cisco uBR7225VXR router—The valid range is from 1 to 2.                                          |  |
|                    | Cisco uBR10012 router—The valid range is from 5 to 8.                                            |  |
| <i>subslot</i>     | Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1. |  |
| <i>port</i>        | Specifies the port number. Valid values are 0 to 4 (depending on the cable interface).           |  |

| Command Default | No default behavior or values. |
|-----------------|--------------------------------|
|-----------------|--------------------------------|

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                                                                                    |
|-----------------|-------------|-------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCB | This command was introduced.                                                                    |
|                 | 12.2(33)SCD | This command was modified. Support was added for Cisco uBR7225VXR and Cisco uBR7246VXR routers. |

**Examples** The following is a sample output of the **show cable mac-domain rcc** command on the cable interface at slot/subslot/port 8/0/0:

```
Router# show cable mac-domain cable 8/0/0 rcc
```

| RCC-ID | RCP            | RCs | MD-DS-SG | CMS | WB/RCC-TMPL  |
|--------|----------------|-----|----------|-----|--------------|
| 1      | 00 00 00 00 00 | 2   | 0        | 0   | WB (101)     |
| 2      | 00 10 00 00 03 | 3   | 2        | 0   | RCC-TMPL (1) |

The following is a sample output of the **show cable mac-domain rcc** command on the cable interface at slot/port 5/0:

```
Router# show cable mac-domain cable 5/0 rcc
```

```
RCC-ID RCP RCs MD-DS-SG CMs WB/RCC-TMPL
1 00 00 00 00 00 3 0 3 WB (25)
```

Table 86 describes the significant fields shown in the display.

**Table 86** *show cable mac-domain rcc Field Descriptions*

| Field       | Description                                                                                                         |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| RCC-ID      | RCC index per MAC domain. The RCC ID refers to the RCC ID output from the <b>show cable modem wideband</b> command. |
| RCP         | The receive channel profile associated with the RCC object.                                                         |
| RCs         | Total number of DS channels.                                                                                        |
| MD-DS-SG    | Indicates the MAC domain DS service group for which the RCC is generated.                                           |
| CM          | Total number of CMs associated with the RCC object.                                                                 |
| WB/RCC-TMPL | Indicates the wideband interface or the RCC template.                                                               |



**Note**

A zero value in the RCP or MD-DS-SG field indicates that the RCC is generated directly through a wideband interface configuration and not through any RCC templates.

**Related Commands**

| Command                         | Description                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>show interface rf-status</b> | Displays the logical up and down state for each of the configured RF channels for a wideband interface. |



# show cable mac-domain upstream-service-group

To display runtime statistics of the MAC domain upstream service group on a cable interface line card, use the **show cable mac-domain upstream-service-group** command in privileged EXEC mode.

**show cable mac-domain cable *slot/subslot/port* upstream-service-group**

|                           |                                        |                                                                                       |
|---------------------------|----------------------------------------|---------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>slot</i>                            | Chassis slot number of the cable interface line card. The valid range is from 0 to 8. |
|                           | <i>subslot</i>                         | Secondary slot number of the cable interface line card. Valid values are 0 or 1.      |
|                           | <i>port</i>                            | Port number. The valid range is from 0 to 4 (depending on the cable interface).       |
|                           | <b>upstream-service-group <i>p</i></b> | Specifies the upstream service group number.                                          |

**Command Modes** Privileged EXEC (#)

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCC    | This command was introduced. |

**Usage Guidelines** This command displays privacy information of a particular CM, identified by its IP address or MAC address.

**Examples** The following is a sample output of the **show cable mac-domain upstream-service-group** command on the cable interface line card at slot/subslot/port 7/1/0:

```
Router# show cable mac-domain cable 7/1/0 upstream-service-group

Cable MD 7/1/0
US-SG-ID : 1 US-Chan : U0,1,2,3,4
Primary-DS: 5/1/0:0 US-SG-ID: 1
 MDD US-List : U0,1,2,3
 MDD Ambiguity : U0,1,2,3
Primary-DS: 3/0/0:0 US-SG-ID: 1
 MDD US-List : U0,1,2,3,4
 MDD Ambiguity : U0,1,2,3,4
Primary-DS: 3/0/0:1 US-SG-ID: 1
 MDD US-List : U0,1,2,3,4
 MDD Ambiguity : U0,1,2,3,4
Primary-DS: 3/0/0:2 US-SG-ID: 1
 MDD US-List : U0,1,2,3,4
 MDD Ambiguity : U0,1,2,3,4
Primary-DS: 3/0/0:3 US-SG-ID: 1
 MDD US-List : U0,1,2,3,4
 MDD Ambiguity : U0,1,2,3,4
```

Table 87 describes the significant fields shown in the display.

**Table 87** *show cable mac-domain upstream-service-group Field Descriptions*

| Field         | Description                                                                                 |
|---------------|---------------------------------------------------------------------------------------------|
| US-SG-ID      | Upstream service group ID.                                                                  |
| US-chan       | Total number of upstream channels on the cable interface line card.                         |
| Primary-DS    | The primary downstream interface.                                                           |
| MDD US-List   | MAC management message: MDD TLV type 7 content, upstream active channel list.               |
| MDD Ambiguity | MAC management message: MDD TLV type 8 content, upstream ambiguity resolution channel list. |

#### Related Commands

| Command                             | Description                                                                                             |
|-------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>show interface<br/>rf-status</b> | Displays the logical up and down states for each of the configured RF channels on a wideband interface. |

# show cable metering-status

To display information about the most recent successful usage-based billing operation, use the **show cable metering-status** command in privileged EXEC mode.

**show cable metering-status [verbose]**

| Syntax Description | verbose | (Optional) Displays the information in a more readable format. |
|--------------------|---------|----------------------------------------------------------------|
|--------------------|---------|----------------------------------------------------------------|

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | Release     | Modification                                                      |
|-----------------|-------------|-------------------------------------------------------------------|
|                 | 12.3(9a)BC  | This command was introduced.                                      |
|                 | 12.2(33)SCB | SAMIS over Internet Protocol Detail Record (IPDR) was introduced. |

| Usage Guidelines | The <b>show cable metering-status</b> command displays information about the most recent successful usage-based billing operation. If usage-based billing is configured for File mode, this command displays the device and file name for the record that was last written. If usage-based billing is configured for Streaming mode, this command displays the IP address and port number for the external server to which the billing record was sent. |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Note**

This command displays the status of the last successful billing record operation. If a failure occurred, the CMTS sends an SNMP trap to the SNMP manager with that information.

| Examples | The following example shows a typical output for the <b>show cable metering-status</b> command when usage-based billing is configured to write the billing records to a local file system: |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show cable metering-status
```

```
destination complete-time flow cpe status
 aggr supp
disk0:R7519-UBR7246-200308-004428 Jun 12 09:33:05 No No success
```

The following example shows a typical output for the **show cable metering-status** command when usage-based billing is configured to stream the billing records to an external server:

```
Router# show cable metering-status
```

```
destination complete-time flow cpe status
 aggr supp
10.11.37.2 :1234 Jun 12 09:33:05 No No success
```

The following example shows a typical output for the verbose form of the **show cable metering-status** command:

```
Router# show cable metering-status verbose
```

**show cable metering-status**

```

Destination : disk0:R7519-UBR7246-20000308-004428
Complete Time : Jun 12 09:33:05
Flow Aggregate : Yes
Cpe list suppression : Yes
Status of last export : success

```

The following example shows a typical output for the **show cable metering-status** command when usage-based billing is configured to use the Internet Protocol Detail Record (IPDR) Exporter to stream the billing records to an external server:

```

Router# show cable metering-status
destination complete-time flow cpe status
 aggr supp
IPDR_Session1 Jun 12 09:33:05 N/A N/A success

```

The following example shows a typical output for the verbose form of the **show cable metering-status** command when usage-based billing is configured to use the IPDR Exporter to stream the billing records to an external server:

```

Router# show cable metering-status verbose
Last export status
Destination : IPDR_Session1
Complete Time : Jun 12 09:36:05
Status of last export : success

```

The following example shows the error message that is displayed when you enter the **show cable metering-status** command but not have enabled usage-based billing:

```

Router# show cable metering-status

CMTS Metering collection not enabled

```

The following example shows if the SAMIS report failed, the output displays the details of the failure:

```

Router# show cable metering-status verbose
Load for five secs: 0%/0%; one minute: 1%; five minutes: 0%
Time source is NTP, .19:24:53.955 PDT Fri Jun 11 2010
Last export status
Destination : 20.1.0.2:5959
Complete Time : Jun11 19:24:40
Flow Aggregate : No
Full records : Yes
Cpe list suppression : No
Source interface : GigabitEthernet0/1
Status of last export : write-error (bulk-data)

```

[Table 88](#) describes the fields displayed by the **show cable metering-status** command.

**Table 88** *show cable metering-status Field Descriptions*

| Field                        | Description                                                                                                                                                                                                                           |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| destination, Destination     | Destination for the billing records. This is a file system device name and file name, if records are being written to a local file system, or an IP address and TCP port number, if records are being streamed to an external server. |
| complete_time, Complete Time | Date and time when the last billing record was written to a local file or streamed to an external server.                                                                                                                             |
| flow aggr, Flow Aggregate    | Indicates whether traffic counters are aggregated in the billing records, so that one total is recorded for the upstream service flows and downstream service flows for each CM.                                                      |

**Table 88** *show cable metering-status Field Descriptions (continued)*

| Field                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cpe suppress, CPE list suppression | <p>Indicates whether CPE IP addresses are included or suppressed in the billing records:</p> <ul style="list-style-type: none"> <li>• Yes = CPE addresses are suppressed and are not included in the billing records.</li> <li>• No = CPE addresses are included in the billing records.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| status, Status of last export      | <p>Indicates the status of the last billing operation:</p> <ul style="list-style-type: none"> <li>• success—The billing records were successfully written to the filesystem (file mode) or transferred to the billing collection server (streaming mode).</li> <li>• connect-failed—The CMTS was able to open the proper socket connection to the server but could not connect to the server.</li> <li>• data-incomplete—A failure occurred during the file write or the streaming to the collection server, and the records that were written might be incomplete.</li> <li>• disk-full—The billing records could not be written because the filesystem does not have sufficient free space.</li> <li>• no-memory—The processor had insufficient memory to collect the billing records.</li> <li>• open-failure—The transfer failed because the CMTS could not open a new file on the filesystem (file mode) or open a socket to the destination IP address and port (streaming mode).</li> <li>• unknown—An unknown error occurred.</li> <li>• write-error (<i>data-type</i>)—The operating system reported an error when attempting to write the billing records (file mode), or the send to the destination socket failed (streaming mode). <ul style="list-style-type: none"> <li>– The value of data-type could be <i>file-header</i>, <i>file-end</i>, <i>bulk-data</i>, <i>sflog</i>, <i>bulk-data</i>, <i>ipdr-data</i>, <i>ipdr-sflog</i>, or <i>ipdr-file</i>.</li> </ul> </li> </ul> |

**Related Commands**

| Command                                | Description                                                                                      |
|----------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable metering destination</b>      | Enables usage-based billing and streams the billing records to an external server.               |
| <b>cable metering filesystem</b>       | Enables usage-based billing and writes the billing records to a file on a local file system.     |
| <b>cable metering source-interface</b> | Enables debugging of usage-based billing operations.                                             |
| <b>snmp-server enable traps cable</b>  | Enables the sending of Simple Network Management Protocol (SNMP) traps for cable-related events. |

# show cable modem

To display information for the registered and unregistered cable modems, use the **show cable modem** command in privileged EXEC mode.

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/subslot/port} [upstream port
[logical-channel-index]] | name fqdn] queue [verbose] [cm-status]
```

**Cisco IOS Release 12.2(33)SCE and later releases**

```
show cable modem [ip-address | mac-address | cable {slot/cable-interface-index |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
[verbose] [cm-status]
```

**Syntax Description**

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific cable modem to be displayed. If you specify the IP address for a CPE device behind a cable modem, information for that cable modem is displayed.                                                                                                                                                                                                                                                                                                |
| <i>mac-address</i>           | (Optional) MAC address of a specific cable modem to be displayed. If you specify the MAC address for a CPE device behind a cable modem, information for that cable modem is displayed.                                                                                                                                                                                                                                                                                                        |
| <b>cable</b>                 | (Optional) Displays the modems on a specific cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <b>upstream port</b>         | (Optional) Displays information for all cable modems using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card.                                                                                                                                                      |

|                              |                                                                                                                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>name</b> <i>fqdn</i>      | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |
| <b>verbose</b>               | Displays detailed information of the cable modems.                                                                                                                                                                                                                  |
| <b>cm-status</b>             | Displays cable modem status events.                                                                                                                                                                                                                                 |
| <b>queue</b>                 | Displays the downstream hierarchical queueing framework (HQF) queue information for a cable modem.                                                                                                                                                                  |
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                      |

## Command Modes

Privileged EXEC (#)

## Command History

This table includes the following release-specific history entries:

- [BC Release](#)
- [C Release](#)
- [E Release](#)
- [N Release](#)
- [T Release](#)
- [X Release](#)
- [SC Release](#)

| BC Release   | Modification                                                                                                                                                                                                                                                                                                                                      |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1  | Additional lines were added to the <b>show cable modem verbose</b> displays, for one or all cable modems, to show information about the dynamic shared-secret feature. Cable modems that fail the dynamic secret authentication checks and then come online are marked with an exclamation point (!), so that this situation can be investigated. |
| 12.2(4)BC1   | Support was added for the Cisco uBR10012 router.                                                                                                                                                                                                                                                                                                  |
| 12.2(8)BC2   | The output for the Online State field was updated for the <b>cable tftp-enforce</b> command. A pound sign (#) appears next to the state value when a cable modem was allowed to come online without attempting to download a DOCSIS configuration file through the cable interface with the Cisco CMTS.                                           |
| 12.2(15)BC1c | The <b>verbose</b> option displays whether dynamic service change requests (DSX) are allowed from cable modems.                                                                                                                                                                                                                                   |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC2      | <p>Two new states—cc(r1) and cc(r2)—have been added to the cable modem MAC state field (see <a href="#">Table 107</a>) to indicate the cable modem status when it has been instructed to change channels and is ranging to obtain a new downstream or upstream channel.</p> <p>Also, three new states—online(pk d), online(ptd), and expire(pk d)—were added to clarify the BPI state when network access has been disabled in the cable modem's DOCSIS configuration file.</p> <p>In addition, the <b>show cable modem verbose</b> command now displays the total amount of time that a cable modem has been online since last registering.</p> |
| 12.3(13a)BC      | <p>New initialization states were added for the MAC State Field:</p> <ul style="list-style-type: none"> <li>• init(d)—The Cisco CMTS has seen DHCPDISCOVER</li> <li>• init(io)—The Cisco CMTS has seen DHCP OFFER</li> <li>• init(dr)—The Cisco CMTS has seen DHCPREQUEST</li> <li>• init(i)—The Cisco CMTS has seen DHCPACK</li> <li>• init(o)—The Cisco CMTS has seen first TFTP packet for TFTP request for cable modem configuration file</li> <li>• init(t)—The Cisco CMTS has seen the TOD request</li> </ul> <p>See <a href="#">Table 107</a> for additional information.</p>                                                             |
| 12.3(21)BC       | <p>All cable bundles are now automatically converted and configured to be in a virtual bundle, and standalone cable interfaces must be manually configured to be in a virtual bundle to operate properly. Previously, new virtual interface bundles and bundle members required reconfiguration, and there could also be standalone interfaces not part of a bundle at all.</p>                                                                                                                                                                                                                                                                  |
| 12.3(23)BC       | <p>The <b>verbose</b> option displays additional information about the cable modem. The following fields have been added to the output of this option:</p> <ul style="list-style-type: none"> <li>• Host Interface</li> <li>• Primary Downstream</li> <li>• Wideband Capable</li> <li>• Voice Enabled</li> <li>• DS Change Times</li> </ul>                                                                                                                                                                                                                                                                                                      |
| <b>C Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 12.1(4)CX        | Support was added for the Cisco uBR10012 router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 12.2(15)CX       | The <b>verbose</b> option displays the sysDescr field for each cable modem, when the <b>cable modem remote-query</b> command has been configured. Other fields have also been added to support DOCSIS 2.0 (ATDMA) operation.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>E Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 12.1(10)EC1      | Adds an exclamation point to cable modems that have exceeded the maximum delay/timing offset specified by the <b>cable map-advance</b> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



|              |                                                                                                                                                                                                                                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(11b)EC1 | The output for the Online State field was updated for the <b>cable tftp-enforce</b> command. A pound sign (#) appears next to the state value when a cable modem was allowed to come online without attempting to download a DOCSIS configuration file through the cable interface with the Cisco CMTS. |
| 12.1(20)EC1  | The three new states—online(pk d), online(ptd), and expire(pk d)—were added to the Cisco IOS Release 12.1 EC train.                                                                                                                                                                                     |

| N Release   | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3(5)NA   | The output was reorganized and the Receive Power field was added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| T Release   | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2.1(1a)T1   | The output of this command was enhanced to show that the Cisco CMTS has detected an unstable return path for a particular cable modem and has compensated with a power adjustment. An asterisk (*) appears in the power adjustment field for a modem when a power adjustment has been made; an exclamation point (!) appears when the cable modem has reached its maximum power transmit level and cannot increase its power level further.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 12.0(7)T    | The <b>detail</b> option was replaced with the <b>verbose</b> option.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| X Release   | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 11.3XA      | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 12.0(4)XI   | The output was expanded to show the primary service identifier (SID) and the customer premises equipment (CPE) count.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 12.0(7)XR   | The output of this command was enhanced to show that the Cisco CMTS has detected an unstable return path for a particular cable modem and has compensated with a power adjustment. An asterisk (*) appears in the power adjustment field for a modem when a power adjustment has been made; an exclamation point (!) appears when the cable modem has reached its maximum power transmit level and cannot increase its power level further.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SC Release  | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 12.2(33)SCA | <p>This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes:</p> <ul style="list-style-type: none"> <li>• Support for the Cisco uBR7225VXR router was added.</li> <li>• Support for specifying the IPv6 address of a cable modem or CPE device was added.</li> <li>• The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a cable modem.</li> <li>• The output column spacing and headings were changed, including some of the following changes: <ul style="list-style-type: none"> <li>– “BPI Enb” has been changed to “BPI”</li> <li>– “DIP” output field was added to indicate support of dual IP for both IPv4 and IPv6 addressing.</li> </ul> </li> <li>• The following new initialization states were added to show initialization of cable modems and CPEs supporting IPv6: <ul style="list-style-type: none"> <li>– init6(s)—CMTS router has seen SOLICIT message.</li> <li>– init6(a)—CMTS router has seen ADVERTISE message.</li> <li>– init6(r)—CMTS router has seen REQUEST message.</li> <li>– init6(i)—CMTS router has seen REPLY message.</li> <li>– init6(o)—CMTS router has seen version 6 TFTP request.</li> <li>– init6(t)—CMTS router has seen version 6 TOD request.</li> </ul> </li> </ul> |
| 12.2(33)SCB | A new keyword, <b>cm-status</b> , was added to display cable modem status events.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|              |                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCC  | <p>This command was modified with the following changes:</p> <ul style="list-style-type: none"> <li>• The command output displays the cable modem attribute bitmasks.</li> <li>• The command output provides basic receive-statistics for all event code types of the specified cable modem.</li> </ul>                                                                                  |
| 12.2(33)SCD  | <p>This command was modified. The <b>cm-status</b> keyword was added to display the cable modem status events and the <b>queue</b> keyword was added to display downstream HQF queue information on the Cisco uBR7225VXR and Cisco uBR7246VXR routers.</p>                                                                                                                               |
| 12.2(33)SCD2 | <p>This command was modified. The command output was modified to display the cable modems that are in upstream and downstream partial service mode.</p>                                                                                                                                                                                                                                  |
| 12.2(33)SCE  | <p>This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i>.</p>                                                                                                                                                                                                                                                                                 |
| 12.2(33)SCE4 | <p>This command was modified. The command output displays online time of the modem since the last counter reset, along with the total time online.</p>                                                                                                                                                                                                                                   |
| 12.2(33)SCF  | <p>This command was modified. The <i>logical-channel-index</i> argument was added. The <b>show cable modem verbose</b> command output was modified to display the downstream channel information for the cable modems.</p>                                                                                                                                                               |
| 12.2(33)SCH  | <p>The <b>show cable modem verbose</b> command output was modified to display the ranging class ID of a cable modem.</p>                                                                                                                                                                                                                                                                 |
| 12.2(33)SCG5 | <p>The output of the command with the <b>verbose</b> keyword was modified to display the status of the Upstream Drop Classifier (UDC) feature. The field “UDC Enabled” was added in the output.</p>                                                                                                                                                                                      |
| 12.2(33)SCH1 | <p>The output of the command with the <b>verbose</b> keyword was modified to display the following:</p> <ul style="list-style-type: none"> <li>• The channel IDs for 16 downstream channels on the Cisco uBR10012 routers using PRE4 and PRE5, and Cisco uBR7200 series routers using NPE-G2.</li> <li>• The number of IPv6 addresses per cable modem and the maximum values.</li> </ul> |

### Usage Guidelines

This command displays information for all cable modems, for all cable modems attached to a specific CMTS cable interface, or for a particular cable modem, identified by its IP address, MAC address, or its domain name. The output is sorted by the cable interface and the cable modem’s MAC address.



#### Note

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.



#### Tip

Several options in the **show cable modem** command do not pause the screen to display the information page by page, even if the **terminal length** command has been used to set the page size of your terminal. Paging and pausing the display could result in outdated or stale information for cable modems, and thus

produce an incorrect snapshot of the current cable modem state of the system. To capture or review this information, use your terminal program's capture buffer to save the information to a file, and then review it offline.

**Tip**

You can also specify the MAC address or IP address for a CPE device, and the Cisco CMTS will display the information for the cable modem that is associated with that CPE device in its internal database.

**Note**

If the CPE IP address is no longer associated with a cable modem, the **show cable modem** command might not display information about the cable modem. To display the IP address of the CPE device for the cable modem, use the **clear cable host ip-address** command to clear the IP address of the modem from the router database, and then enter the **ping docsis mac-address** command, which resolves the MAC address by sending the DOCSIS ping to the CM.

**Note**

When an IPv4 CPE is moved from one bundle interface to another bundle interface, the **show cable modem** command displays duplicate CPE device under the original modem and new modem. CPE ping may also fail. To prevent duplication, use the **clear cable host** command to manually remove the old CPE device entry before moving the IPv4 CPE from one bundle interface to another. Reload the CPE after moving it to another bundle interface.

Refer to the following document on Cisco.com for additional information about cable interface bundling and virtual interface bundling on the Cisco CMTS:

- *Cable Interface Bundling and Virtual Interface Bundling on the Cisco CMTS*

### Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

### Operation of the show cable modem Commands with Different Cable Interface Line Cards

The **show cable modem** commands display the most current information for standard cable interface line cards. If the card itself is down, the **show cable modem** commands still show whatever information is appropriate (such as offline cable modems and flap list information).

The **show cable modem** commands function slightly different when used on routers that are using Broadband Processing Engine (BPE) cable interface line cards (such as the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, or Cisco uBR10-MC5X20S/U/H). When BPE cards are the only cable interface cards installed, the **show cable modem** commands do not display any output until at least one BPE card is up and communicating with the router processor. If the BPE cards are not yet up, the **show cable modem** command does not display any output.

## Examples

### Example of the show cable modem Command Output for all cable modems

The following sample output from the **show cable modem** command shows the default cable modems displays for individual cable modems.

Router# **show cable modem**

| MAC Address    | IP Address  | I/F     | MAC State | Prim Sid | RxPwr (db) | Timing Offset | Num CPEs | BPI Enbld |
|----------------|-------------|---------|-----------|----------|------------|---------------|----------|-----------|
| 0010.7b6b.58c1 | 0.0.0.0     | C4/0/U5 | offline   | 5        | -0.25      | 2285          | 0        | yes       |
| 0010.7bed.9dc9 | 0.0.0.0     | C4/0/U5 | offline   | 6        | -0.75      | 2290          | 0        | yes       |
| 0010.7bed.9dbb | 0.0.0.0     | C4/0/U5 | offline   | 7        | 0.50       | 2289          | 0        | yes       |
| 0010.7b6b.58bb | 0.0.0.0     | C4/0/U5 | offline   | 8        | 0.00       | 2290          | 0        | yes       |
| 0010.7bb3.fcd1 | 10.20.113.2 | C5/0/U5 | online    | 1        | 0.00       | 1624          | 0        | yes       |
| 0010.7bb3.fcd1 | 0.0.0.0     | C5/0/U5 | init(r1)  | 2        | -20.00     | 1624          | 0        | no        |
| 0010.7b43.aa7f | 0.0.0.0     | C5/0/U5 | init(r2)  | 3        | 7.25       | 1623          | 0        | no        |

### Example of the show cable modem Command for a Specified MAC Address

Router# **show cable modem 0010.7bb3.fcd1**

| MAC Address    | IP Address  | I/F     | MAC State | Prim Sid | RxPwr (db) | Timing Offset | Num CPEs | BPI Enbld |
|----------------|-------------|---------|-----------|----------|------------|---------------|----------|-----------|
| 0010.7bb3.fcd1 | 10.20.113.2 | C5/0/U5 | online    | 1        | 0.00       | 1624          | 0        | Y         |

### Example of the show cable modem Command for all cable modems on a Cisco uBR10012 Router

The following shows a typical display for a Cisco uBR10012 router:



#### Note

The asterisk(\*) in the Primary SID (Prim Sid) field indicates that the modem has service flows with zero blaze index in Cisco IOS Release 12.3(23)BC. In Cisco IOS Release 12.2(33)SCB and later, the asterisk that may appear in the Primary SID field does not signify anything.

Router# **show cable modem**

| MAC Address    | IP Address      | I/F       | MAC State  | Prim Sid | RxPwr (db) | Timing Offset | Num CPEs | BPI Enb |
|----------------|-----------------|-----------|------------|----------|------------|---------------|----------|---------|
| 0010.9507.01db | 144.205.151.130 | C5/1/0/U5 | online(pt) | 1        | 0.25       | 938           | 1        | N       |
| 0080.37b8.e99b | 144.205.151.131 | C5/1/0/U5 | online     | 2        | -0.25      | 1268          | 0        | N       |
| 0002.fdfa.12ef | 144.205.151.232 | C6/1/0/U0 | online(pt) | 13       | -0.25      | 1920          | 1        | N       |
| 0002.fdfa.137d | 144.205.151.160 | C6/1/0/U0 | online     | *16      | -0.50      | 1920          | 1        | N       |
| 0003.e38f.e9ab | 144.205.151.237 | C6/1/0/U0 | online     | 3        | -0.50      | 1926          | 1        | N       |
| 0003.e3a6.8173 | 144.205.151.179 | C6/1/1/U2 | offline    | *4       | 0.50       | 1929          | 0        | N       |
| 0003.e3a6.8195 | 144.205.151.219 | C6/1/1/U2 | online(pt) | 22       | -0.50      | 1929          | 1        | N       |
| 0006.28dc.37fd | 144.205.151.244 | C6/1/1/U2 | online(pt) | 61       | 0.00       | 1925          | 2        | N       |
| 0006.28e9.81c9 | 144.205.151.138 | C6/1/1/U2 | online(pt) | 2        | !0.75      | 1925          | 1        | N       |
| 0006.28f9.8bbd | 144.205.151.134 | C6/1/1/U2 | #online    | 25       | -0.25      | 1924          | 1        | N       |
| 0006.28f9.9d19 | 144.205.151.144 | C6/1/1/U2 | online(pt) | 28       | 0.25       | 1924          | 1        | N       |
| 0010.7bed.9b6d | 144.205.151.228 | C6/1/1/U2 | online(pt) | 59       | 0.25       | 1554          | 1        | N       |
| 0002.fdfa.12db | 144.205.151.234 | C7/0/0/U0 | online     | 15       | -0.75      | 1914          | 1        | N       |
| 0002.fdfa.138d | 144.205.151.140 | C7/0/0/U5 | online     | 4        | 0.00       | 1917          | 1        | N       |



```

DSA/DSX messages : reject all
Dynamic Secret : A3D1028F36EBD54FDCC2F74719664D3F
Total Time Online : 16:16

```

**Note**

The “Number of CPES” field shows the value set for the CM, not the value for the CMTS that is set by the **cable modem max-cpe** command. In Cisco IOS Release 12.2(15)BC1 and later releases, the **verbose** display also includes information about the dynamic shared-secret feature (see the **cable dynamic-secret** command).

**Note**

An asterisk (\*) in the Receive Power column indicates that a power adjustment has been made for that CM. An exclamation point (!) in the Receive Power column indicates that the cable modem has reached its maximum power transmit level and cannot increase its power level further. An exclamation point (!) in the Timing Offset column indicates that the cable modem has exceeded the maximum delay and timing offset specified by the **cable map-advance** command.

A pound sign (#) in the MAC State column indicates that the **cable tftp-enforce mark-only** command has been used for the cable modem to attempt a TFTP download of the DOCSIS configuration file before registering, but the cable modem did not do so (Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases).

**Tip**

The **show cable modem** command displays the cable modem timing offset in DOCSIS ticks, while other commands, such as **cable map-advance**, display the offset in microseconds. Use the following method to convert microseconds to DOCSIS ticks:  $\text{ticks} = \text{microseconds} * 64 / 6.25$ .

### Example of the Updated show cable modem verbose Command for a Specified MAC Address in Cisco IOS Release 12.3(23)BC

The following example shows sample output for the **verbose** option for a particular cable modem for the Cisco IOS Release 12.3(23)BC with new output fields:

```

Router# show cable modem 0000.39b9.ac51 verbose

MAC Address : 0000.39b9.ac51
IP Address : 55.1.176.11
Prim Sid : 7
QoS Profile Index : 5
Host Interface : C8/0/0/U5
Primary Downstream : Mo3/0/1:3 (RfId : 27)
Wideband Capable : N
sysDescr : Toshiba PacketCable 1.0 EMTA ; <<HW_REV: 13.0.0;
VENDOR: Toshiba Corporation; BOOTR: 2.2; SW_REV: 6.1.318; MODEL: PCX3000>>
Upstream Power : 29.00 dBmV (SNR = 16.07 dB)
Downstream Power : 14.90 dBmV (SNR = 34.30 dB)
Timing Offset : 1774
Initial Timing Offset : 1774
Curr US Timing Adjust : 272
Prev US Timing Adjust : 0
Received Power : 0.00 dBmV
MAC Version : DOC1.1
QoS Provisioned Mode : DOC1.0
Enable DOCSIS2.0 Mode : Y
Phy Operating Mode : tdma
Capabilities : {Frag=N, Concat=Y, PHS=N, Priv=}
Sid/Said Limit : {Max US Sids=0, Max DS Sids=0}

```

```

Optional Filtering Support : {802.1P=N, 802.1Q=N}
Transmit Equalizer Support : {Taps/Symbol= 0, Num of Taps= 0}
Number of CPE IPs : 0(Max CPE IPs = 17)
CFG Max-CPE : 3
Flaps : 7(Sep 16 20:04:13)
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 0 exhausted
Total US Flows : 1(1 active)
Total DS Flows : 1(1 active)
Total US Data : 3399 packets, 1956063 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 125 packets, 10704 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 10
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Total Time Online : 7d22h

```



**Note** In Cisco IOS Release 12.3(23)BC, the output for this command does not display information about dynamic shared secret.

#### Example of show cable modem Command for a cable modem or CPE With a Specified IPv6 Address

The following example shows sample output for the **show cable modem** command for a cable modem with the IPv6 address of 2001:ODBA:4321:600:980D:E743:174F:1E48.



**Note**

The IP Address field shows “---” because the IPv6 address is too long for the size of the output field. To view a complete IPv6 address for a device, use the **verbose** form of the command.

```

Router# show cable modem 2001:ODBA:4321:600:980D:E743:174F:1E48

```

| MAC Address    | IP Address | I/F       | MAC State | Prim Sid | RxPwr (dBmv) | Timing Offset | Num CPE | P I |
|----------------|------------|-----------|-----------|----------|--------------|---------------|---------|-----|
| 0019.474a.ccd0 | ---        | C5/0/1/U0 | w-online  | 38       | 0.00         | 1580          | 0       | N   |

#### Example of the show cable modem verbose Command Output That Shows cable modem Attribute Masks in Cisco IOS Release 12.2(33)SCC

The following example shows the sample output for the **verbose** option for a particular cable modem in Cisco IOS Release 12.2(33)SCC:

```

Router# show cable modem 001a.c3ff.ce9e verbose

```

|                             |                       |
|-----------------------------|-----------------------|
| MAC Address                 | : 0019.474a.d396      |
| IP Address                  | : 10.10.2.4           |
| IPv6 Address                | : ---                 |
| Dual IP                     | : N                   |
| Prim Sid                    | : 1                   |
| Host Interface              | : C5/0/0/U2           |
| MD-DS-SG / MD-US-SG         | : 1 / N/A             |
| MD-CM-SG                    | : 0x100               |
| Primary Downstream          | : C5/0/0 (RfId : 240) |
| Wideband Capable            | : Y                   |
| RCP Index                   | : 2                   |
| RCP ID                      | : 00 10 18 33 81      |
| Multi-Transmit Channel Mode | : N                   |
| Upstream Channel            | : US2                 |



```

Ranging Status : sta
Upstream Power (dBmV) : 0.00
Upstream SNR (dB) : 36.12
Received Power (dBmV) : 0.00
Timing Offset (97.6 ns) : 1018
Initial Timing Offset : 1018
Rng Timing Adj Moving Avg(0.381 ns) : 0
Rng Timing Adj Lt Moving Avg : 0
Rng Timing Adj Minimum : 0
Rng Timing Adj Maximum : 0
Pre-EQ Good : 0
Pre-EQ Scaled : 0
Pre-EQ Impulse : 0
Pre-EQ Direct Loads : 0
Good Codewords rx : 457865
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0
Phy Operating Mode : tdma
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ----- dB)
MAC Version : DOC2.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= online(pt), Security=assign(tek)}
Capabilities : {Frag=Y, Concat=Y, PHS=Y}
Security Capabilities : {Priv=BPI+, EAE=N, Key_len=56}
L2VPN Capabilities : {L2VPN=N, eSAFE=N}
Sid/Said Limit : {Max US Sids=16, Max DS Sids=15}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=N}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
Number of CPE IPs : 0(Max CPE IPs = 16)
CFG Max-CPE : 1
Flaps : 0()
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 0 exhausted
Total US Flows : 1(1 active)
Total DS Flows : 1(1 active)
Total US Data : 12937 packets, 1079852 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 6226 packets, 459372 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
LB group ID assigned (index) : N/A (N/A)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 2
Number of Multicast DSIDs Support : 16
MDF Capability Mode : 0

```

## ■ show cable modem

```

IGMP/MLD Version : IGMPv2
FCType10 Forwarding Support : N
Features Bitmask : 0x0
Total Time Online : 7d4h18m
CFG Max IPv6 CPE Prefix : 1024 (-1 used)

```

**Example of the show cable modem Command Output for a Cable Modem Operating in the MTC Mode**

The following example shows the sample output for the **verbose** option for a particular cable modem operating in the MTC mode in Cisco IOS Release 12.2(33)SCC:

Router# **show cable modem 0014.f831.d596 verbose**

```

MAC Address : 001e.6bfa.f02e
IP Address : 30.10.0.6
IPv6 Address : ---
Dual IP : N
Prim Sid : 5
Host Interface : C5/1/0/UB
MD-DS-SG / MD-US-SG : 1 / 1
MD-CM-SG : 0xF0101
Primary Wideband Channel ID : 48
Primary Downstream : Mo3/0/0:0 (Rfid : 120)
Wideband Capable : Y
RCP Index : 3
RCP ID : 00 10 00 00 04
Multi-Transmit Channel Mode : Y
Upstream Channel : US1 US2 US3 US4
Ranging Status : sta sta sta sta
Upstream Power (dBmV) : 0.00 0.00 0.00 0.00
Upstream SNR (dB) : 36.12 36.12 36.12 33.1
Received Power (dBmV) : 0.00 1.00 0.00 -0.75
Reported Transmit Power (dBmV) : 45.00 45.00 45.00 54.75
Peak Transmit Power (dBmV) : 51.00 51.00 56.00 56.00
Minimum Transmit Power (dBmV) : 24.00 24.00 21.00 18.00
Timing Offset (97.6 ns) : 2312 2281 2282 2282
Initial Timing Offset : 2314 2058 2058 2058
Rng Timing Adj Moving Avg(0.381 ns) : 7 4 0 -94
Rng Timing Adj Lt Moving Avg : 63 30 11 -144
Rng Timing Adj Minimum : -512 -256 -256 -512
Rng Timing Adj Maximum : 256 57088 57344 57344
Pre-EQ Good : 0 0 0 0
Pre-EQ Scaled : 0 0 0 0
Pre-EQ Impulse : 0 0 0 0
Pre-EQ Direct Loads : 0 0 0 0
Good Codewords rx : 5012 4996 4992 4990
Corrected Codewords rx : 0 0 0 0
Uncorrectable Codewords rx : 0 0 0 0
Phy Operating Mode : atdma* atdma* tdma* tdma*
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ----- dB)
MAC Version : DOC3.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= w-online, Security=disabled}
Capabilities : {Frag=N, Concat=N, PHS=Y}
Security Capabilities : {Priv=, EAE=Y, Key_len=}
L2VPN Capabilities : {L2VPN=N, eSAFE=N}
Sid/Said Limit : {Max US Sids=8, Max DS Said=24}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=N}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
Number of CPE IPs : 0(Max CPE IPs = 16)
CFG Max-CPE : 4
Flaps : 0()

```

```

Errors : 0 CRCs, 0 HCSeS
Stn Mtn Failures : 0 aborts, 0 exhausted
Total US Flows : 2(2 active)
Total DS Flows : 1(1 active)
Total US Data : 6 packets, 1557 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 0 packets, 0 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
LB group ID assigned (index) : N/A (N/A)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 2
Number of Multicast DSIDs Support : 24
MDF Capability Mode : 2
IGMP/MLD Version : IGMPv3
FCType10 Forwarding Support : Y
Features Bitmask : 0x0
Total Time Online : 1d16h
CM Initialization Reason : NO_PRIM_SF_USCHAN
CFG Max IPv6 CPE Prefix : 16 (-1 used)

```

**Note**

An asterisk (\*) in the Phy Operating Mode row indicates the type of PHY-layer modulation that the cable modem (operating in the MTC mode) is using: tdma or atdma.

**Example of the show cable modem verbose Command Output in Cisco IOS Release 12.2(33)SCE4**

The following example shows the sample output for the **verbose** option for a particular cable modem in Cisco IOS Release 12.2(33)SCE4:

```

Router# show cable modem 001a.c3ff.ce9e verbose

MAC Address : 0014.e84f.1630
IP Address : 50.6.9.4
IPv6 Address : ---
Dual IP : N
Prim Sid : 1
Host Interface : C6/1/0/U0
MD-DS-SG / MD-US-SG : N/A / N/A
MD-CM-SG : 0x2D0000
Primary Downstream : C6/1/0 (RfId : 600)
Wideband Capable : N
RCP Index : 0
RCP ID : 00 00 00 00 00
Downstream Channel DCID RF Channel : 73 6/1/0

```

## show cable modem

```

Multi-Transmit Channel Mode : N
Upstream Channel : US0
Ranging Status : sta
Upstream Power (dBmV) : 0.00
Upstream SNR (dB) : 31.26
Received Power (dBmV) : 0.50
Timing Offset (97.6 ns): 1237
Initial Timing Offset : 1237
Rng Timing Adj Moving Avg(0.381 ns): 503
Rng Timing Adj Lt Moving Avg : 402
Rng Timing Adj Minimum : 0
Rng Timing Adj Maximum : 1024
Pre-EQ Good : 0
Pre-EQ Scaled : 0
Pre-EQ Impulse : 0
Pre-EQ Direct Loads : 0
Good Codewords rx : 429
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0
Phy Operating Mode : tdma
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ----- dB)
MAC Version : DOC2.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= online, Security=disabled}
Capabilities : {Frag=Y, Concat=Y, PHS=Y}
Security Capabilities : {Priv=, EAE=N, Key_len=}
L2VPN Capabilities : {L2VPN=N, eSAFE=N}
Sid/Said Limit : {Max US Sids=16, Max DS Sids=15}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=N}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
Number of CPE IPs : 0(Max CPE IPs = 16)
CFG Max-CPE : 1
Flaps : 0()
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 0 exhausted
Total US Flows : 2(2 active)
Total DS Flows : 2(2 active)
Total US Data : 20 packets, 6786 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 11255 packets, 720320 bytes
Total DS Throughput : 5119 bits/sec, 9 packets/sec
LB group ID assigned (index) : N/A (N/A)
LB group ID in config file (index): N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 30
CM Downstream Filter Group : 29
CPE Upstream Filter Group : 1
CPE Downstream Filter Group : 1
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 0

```

```

Number of Multicast DSIDs Support : 0
MDF Capability Mode : 0
IGMP/MLD Version : IGMPv2
FCType10 Forwarding Support : N
Features Bitmask : 0x0
Total Time Online : 18:53 (18:53 since last counter reset)
!From Cisco IOS Release 12.2(33)SCE4 onwards, the command output shows online time of the
!modem since the last counter reset.
CFG Max IPv6 CPE Prefix : 16 (-1 used)

```

### Example of the show cable modem verbose Command in Cisco IOS Release 12.2(33)SCF

The following is a sample output of the **show cable modem verbose** command in Cisco IOS Release 12.2(33)SCF:

Router# **show cable modem 10.1.0.2 verbose**

```

MAC Address : 001e.6bfb.0a60
IP Address : 10.1.0.2
IPv6 Address : ---
Dual IP : N
Prim Sid : 43
Host Interface : C7/0/0/UB
MD-DS-SG / MD-US-SG : 1 / 1
MD-CM-SG : 0x3C0101
Primary Wideband Channel ID : 897 (Wi7/0/0:0)
Primary Downstream : In7/0/0:0 (RfId : 720)
Wideband Capable : Y
RCP Index : 3
RCP ID : 00 10 00 00 04
Multi-Transmit Channel Mode : Y
Upstream Channel : US0 US1 US2
Ranging Status : sta sta sta
Upstream SNR (dB) : 33.1 33.1 33.1
Upstream Data SNR (dB) : 22.78 22.78 22.78
Received Power (dBmV) : 0.50 0.00 0.00
Reported Transmit Power (dBmV) : 51.00 51.00 51.00
Peak Transmit Power (dBmV) : 51.00 51.00 51.00
Minimum Transmit Power (dBmV) : 24.00 24.00 24.00
Timing Offset (97.6 ns): 1302 1303 1303

```

The following example is a sample output of the **show cable modem verbose** command that displays the downstream channel information for a specific cable modem identified by its IP address:

Router# **show cable modem 80.62.0.4 verbose**

```

MAC Address : 0018.6832.0eb2
IP Address : 80.62.0.4
IPv6 Address : ---
Dual IP : N
Prim Sid : 13
Host Interface : C6/1/0/U0
MD-DS-SG / MD-US-SG : 3 / N/A
MD-CM-SG : 0x2D0300
Primary Downstream : In6/1/0:0 (RfId : 600)
Wideband Capable : N
RCP Index : 0
RCP ID : 00 00 00 00 00
Downstream Channel DCID RF Channel : 193 6/1/0:0
Multi-Transmit Channel Mode : N
Upstream Channel : US0
Ranging Status : sta
Upstream Power (dBmV) : 0.00
Upstream SNR (dB) : 36.12

```

## show cable modem

```

Upstream Data SNR (dB) : --
Received Power (dBmV) : 0.00
Timing Offset (97.6 ns) : 1192
Initial Timing Offset : 1192
Rng Timing Adj Moving Avg(0.381 ns) : -1
Rng Timing Adj Lt Moving Avg : -7
Rng Timing Adj Minimum : -256
Rng Timing Adj Maximum : 0
Pre-EQ Good : 0
Pre-EQ Scaled : 0
Pre-EQ Impulse : 0
Pre-EQ Direct Loads : 0
Good Codewords rx : 42
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0
Phy Operating Mode : tdma
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ----- dB)
MAC Version : DOC2.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= online, Security=disabled}
Capabilities : {Frag=Y, Concat=Y, PHS=Y}
Security Capabilities : {Priv=, EAE=N, Key_len=}
L2VPN Capabilities : {L2VPN=N, eSAFE=N}
Sid/Said Limit : {Max US Sids=16, Max DS Sids=15}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=N}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
Number of CPE IPs : 0(Max CPE IPs = 16)
CFG Max-CPE : 1
Flaps : 0()
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 0 exhausted
Total US Flows : 2(2 active)
Total DS Flows : 2(2 active)
Total US Data : 9 packets, 4545 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 9 packets, 3114 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
LB group ID assigned (index) : N/A (N/A)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 0
Number of Multicast DSIDs Support : 0
MDF Capability Mode : 0
IGMP/MLD Version : IGMPv2
FCType10 Forwarding Support : N

```

```

Features Bitmask : 0x0
Total Time Online : 4d14h
CFG Max IPv6 CPE Prefix : 16 (-1 used)

```

The following example is a sample output of the **show cable modem verbose** command that displays the downstream channel information for a specific cable interface:

Router# **show cable modem Cable 6/1/0 verbose**

```

MAC Address : 0018.6832.0eb2
IP Address : 80.62.0.4
IPv6 Address : ---
Dual IP : N
Prim Sid : 13
Host Interface : C6/1/0/U0
MD-DS-SG / MD-US-SG : 3 / N/A
MD-CM-SG : 0x2D0300
Primary Downstream : In6/1/0:0 (RfId : 600)
Wideband Capable : N
RCP Index : 0
RCP ID : 00 00 00 00 00
Downstream Channel DCID RF Channel : 193 6/1/0:0
Multi-Transmit Channel Mode : N
Upstream Channel : US0
Ranging Status : sta
Upstream Power (dBmV) : 0.00
Upstream SNR (dB) : 36.12
Upstream Data SNR (dB) : --
Received Power (dBmV) : 0.00
Timing Offset (97.6 ns) : 1192
Initial Timing Offset : 1192
Rng Timing Adj Moving Avg(0.381 ns) : 0
Rng Timing Adj Lt Moving Avg : 0
Rng Timing Adj Minimum : 0
Rng Timing Adj Maximum : 256
Pre-EQ Good : 0
Pre-EQ Scaled : 0
Pre-EQ Impulse : 0
Pre-EQ Direct Loads : 0
Good Codewords rx : 66
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0
Phy Operating Mode : tdma
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ----- dB)
MAC Version : DOC2.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= online, Security=disabled}
Capabilities : {Frag=Y, Concat=Y, PHS=Y}
Security Capabilities : {Priv=, EAE=N, Key_len=}
L2VPN Capabilities : {L2VPN=N, eSAFE=N}
Sid/Said Limit : {Max US Sids=16, Max DS Sids=15}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=N}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
Number of CPE IPs : 0(Max CPE IPs = 16)
CFG Max-CPE : 1
Flaps : 1(Mar 22 22:39:59)
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 1 exhausted
Total US Flows : 2(2 active)
Total DS Flows : 2(2 active)
Total US Data : 2 packets, 1010 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec

```

## show cable modem

```

Total DS Data : 2 packets, 692 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
LB group ID assigned (index) : N/A (N/A)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 0
Number of Multicast DSIDs Support : 0
MDF Capability Mode : 0
IGMP/MLD Version : IGMPv2
FCType10 Forwarding Support : N
Features Bitmask : 0x0
Total Time Online : 1d2h33m
CFG Max IPv6 CPE Prefix : 16 (-1 used)

MAC Address : 0018.6832.069e
IP Address : 80.62.0.3
IPv6 Address : ---
Dual IP : N
Prim Sid : 15
Host Interface : C6/1/0/U0
MD-DS-SG / MD-US-SG : 3 / N/A
MD-CM-SG : 0x2D0300
Primary Downstream : In6/1/0:0 (RfId : 600)
Wideband Capable : N
RCP Index : 0
RCP ID : 00 00 00 00 00
Downstream Channel DCID RF Channel : 193 6/1/0:0
Multi-Transmit Channel Mode : N
Upstream Channel : US0
Ranging Status : sta
Upstream Power (dBmV) : 0.00
Upstream SNR (dB) : 36.12
Upstream Data SNR (dB) : --
Received Power (dBmV) : 0.50
Timing Offset (97.6 ns) : 1196
Initial Timing Offset : 1196
Rng Timing Adj Moving Avg(0.381 ns) : -39
Rng Timing Adj Lt Moving Avg : -92
Rng Timing Adj Minimum : -256
Rng Timing Adj Maximum : 0
Pre-EQ Good : 0
Pre-EQ Scaled : 0
Pre-EQ Impulse : 0
Pre-EQ Direct Loads : 0
Good Codewords rx : 54
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0

```



```

Phy Operating Mode : tdma
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ----- dB)
MAC Version : DOC2.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= online, Security=disabled}
Capabilities : {Frag=Y, Concat=Y, PHS=Y}
Security Capabilities : {Priv=, EAE=N, Key_len=}
L2VPN Capabilities : {L2VPN=N, eSAFE=N}
Sid/Said Limit : {Max US Sids=16, Max DS Sids=15}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=N}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
Number of CPE IPs : 0(Max CPE IPs = 16)
CFG Max-CPE : 1
Flaps : 3(Mar 20 09:22:20)
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 1 exhausted
Total US Flows : 2(2 active)
Total DS Flows : 2(2 active)
Total US Data : 13 packets, 6565 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 13 packets, 4498 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
LB group ID assigned (index) : N/A (N/A)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 0
Number of Multicast DSIDs Support : 0
MDF Capability Mode : 0
IGMP/MLD Version : IGMPv2
FCType10 Forwarding Support : N
Features Bitmask : 0x0
Total Time Online : 6d12h
CFG Max IPv6 CPE Prefix : 16 (-1 used)

```

The following example is a sample output of the **show cable modem verbose** command that displays the downstream channel information for all cable modems:

```
Router# show cable modem verbose
```

```

MAC Address : 0006.2854.740b
IP Address : 0.0.0.0
IPv6 Address : ---
Dual IP : N
Prim Sid : 12

```

## show cable modem

```

QoS Profile Index : 2
Host Interface : C6/1/0/U0
MD-DS-SG / MD-US-SG : 3 / N/A
MD-CM-SG : 0x2D0300
Primary Downstream : In6/1/0:0 (Rfid : 600)
Wideband Capable : N
RCP Index : 0
RCP ID : 00 00 00 00 00
Downstream Channel DCID RF Channel : 193 6/1/0:0
Multi-Transmit Channel Mode : N
Upstream Channel :
Ranging Status :
Upstream Power (dBmV) :
Upstream SNR (dB) :
Upstream Data SNR (dB) :
Received Power (dBmV) :
Timing Offset (97.6 ns) :
Initial Timing Offset :
Rng Timing Adj Moving Avg(0.381 ns) :
Rng Timing Adj Lt Moving Avg :
Rng Timing Adj Minimum :
Rng Timing Adj Maximum :
Pre-EQ Good :
Pre-EQ Scaled :
Pre-EQ Impulse :
Pre-EQ Direct Loads :
Good Codewords rx :
Corrected Codewords rx :
Uncorrectable Codewords rx :
Phy Operating Mode :
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ----- dB)
MAC Version : DOC1.0
QoS Provisioned Mode : DOC1.0
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= offline, Security=disabled}
Capabilities : {Frag=N, Concat=N, PHS=N}
Security Capabilities : {Priv=, EAE=N, Key_len=}
L2VPN Capabilities : {L2VPN=N, eSAFE=N}
Sid/Said Limit : {Max US Sids=0, Max DS Sids=0}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=N}
Transmit Equalizer Support : {Taps/Symbol= 0, Num of Taps= 0}
Number of CPE IPs : 0(Max CPE IPs = 16)
CFG Max-CPE : 16
Flaps : 8218(Mar 22 03:17:15)
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 222 exhausted
Total US Flows : 1(1 active)
Total DS Flows : 1(1 active)
Total US Data : 454 packets, 32291 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 0 packets, 0 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
LB group ID assigned (index) : N/A (N/A)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :

```

```

Service Type ID in config file :
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 0
Number of Multicast DSIDs Support : 0
MDF Capability Mode : 0
IGMP/MLD Version : IGMPv2
FCType10 Forwarding Support : N
Features Bitmask : 0x0
Total Time Online : 00:00
CFG Max IPv6 CPE Prefix : 16 (-1 used)

MAC Address : 0018.6832.0eb2
IP Address : 80.62.0.4
IPv6 Address : ---
Dual IP : N
Prim Sid : 13
Host Interface : C6/1/0/U0
MD-DS-SG / MD-US-SG : 3 / N/A
MD-CM-SG : 0x2D0300
Primary Downstream : In6/1/0:0 (RfId : 600)
Wideband Capable : N
RCP Index : 0
RCP ID : 00 00 00 00 00
Downstream Channel DCID RF Channel : 193 6/1/0:0
Multi-Transmit Channel Mode : N
Upstream Channel : US0
Ranging Status : sta
Upstream Power (dBmV) : 0.00
Upstream SNR (dB) : 36.12
Upstream Data SNR (dB) : --
Received Power (dBmV) : 0.00
Timing Offset (97.6 ns) : 1192
Initial Timing Offset : 1192
Rng Timing Adj Moving Avg(0.381 ns) : -1
Rng Timing Adj Lt Moving Avg : -7
Rng Timing Adj Minimum : -256
Rng Timing Adj Maximum : 0
Pre-EQ Good : 0
Pre-EQ Scaled : 0
Pre-EQ Impulse : 0
Pre-EQ Direct Loads : 0
Good Codewords rx : 42
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0
Phy Operating Mode : tdma
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ----- dB)
MAC Version : DOC2.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= online, Security=disabled}
Capabilities : {Frag=Y, Concat=Y, PHS=Y}
Security Capabilities : {Priv=, EAE=N, Key_len=}
L2VPN Capabilities : {L2VPN=N, eSAFE=N}
Sid/Said Limit : {Max US Sids=16, Max DS Sids=15}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=N}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}

```

## ■ show cable modem

```

Number of CPE IPs : 0 (Max CPE IPs = 16)
CFG Max-CPE : 1
Flaps : 0()
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 0 exhausted
Total US Flows : 2(2 active)
Total DS Flows : 2(2 active)
Total US Data : 9 packets, 4545 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 9 packets, 3114 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
LB group ID assigned (index) : N/A (N/A)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 0
Number of Multicast DSIDs Support : 0
MDF Capability Mode : 0
IGMP/MLD Version : IGMPv2
FCType10 Forwarding Support : N
Features Bitmask : 0x0
Total Time Online : 4d14h
CFG Max IPv6 CPE Prefix : 16 (-1 used)

```

**Example of the show cable modem Command Output on the Cisco uBR7225VXR and Cisco uBR7246VXR Routers**

The following example shows the sample output for the **cm-status** option in Cisco IOS Release 12.2(33)SCD on a Cisco uBR7246VXR router:

Router# **show cable modem cm-status**

| I/F  | MAC Address    | Event            | TID | Count | Error | Dups | Time            |
|------|----------------|------------------|-----|-------|-------|------|-----------------|
| C5/0 | 001e.6bfb.29a6 | Seq out-of-range | 1   | 1     | 0     | 1    | Jan 18 09:00:19 |
| C7/0 | 001c.ea2b.79b2 | MDD timeout      | 0   | 0     | 1     | 0    | Jan 11 11:29:22 |
|      |                | QAM failure      | 0   | 0     | 1     | 0    | Jan 11 11:29:02 |
|      |                | MDD recovery     | 0   | 0     | 1     | 0    | Jan 11 11:30:20 |
|      |                | QAM recovery     | 0   | 0     | 1     | 0    | Jan 11 11:30:13 |
| C7/0 | 001c.ea2b.78b0 | MDD timeout      | 0   | 0     | 1     | 0    | Jan 11 11:29:16 |
|      |                | QAM failure      | 0   | 0     | 1     | 0    | Jan 11 11:28:53 |
|      |                | MDD recovery     | 0   | 0     | 1     | 0    | Jan 11 11:29:59 |
|      |                | QAM recovery     | 0   | 0     | 1     | 0    | Jan 11 11:29:46 |

The following example shows the sample output of the **queue** option for a particular cable modem in Cisco IOS Release 12.2(33)SCD:

Router# **show cable modem 40.3.192.2 queue**

```

* idx/gqid Len/Limit Deqs Drops CIR MIR/PR ForwInt SFID
 pkts pkts pkts kbps kbps
BE Queues:
 3/43 0/128 103 0 0 0/0 In5/1:1 Ca5/1:22

CIR Queues:

Low Latency Queues:

```

### Example of the show cable modem Command Output for Partial Service Mode

The following example shows the sample output of the **show cable modem** command that displays the cable modems that are in upstream (indicated by “p” under I/F) and downstream partial service mode (indicated by “p-online” under MAC State):

Router# **show cable modem**

| MAC Address    | IP Address | I/F       | MAC State    | Prim Sid | RxPwr (dBmv) | Timing Offset | Num CPE | D I |
|----------------|------------|-----------|--------------|----------|--------------|---------------|---------|-----|
| 0016.9252.9ac0 | 2.99.81.4  | C7/0/0/U0 | online(pt)   | 1        | 0.00         | 1332          | 0       | N   |
| 000f.2172.229d | 2.99.81.36 | C7/0/0/U3 | online(pt)   | 2        | 0.50         | 1778          | 0       | N   |
| 001e.6bfb.33a0 | 2.99.81.14 | C7/0/0/p  | p-online(pt) | 3        | -0.50        | 1424          | 0       | N   |
| 0022.cef4.3d9a | 2.99.81.23 | C7/0/0/p  | p-online(pt) | 4        | 0.00         | 1438          | 0       | N   |
| 0019.474a.c456 | 2.99.81.18 | C7/0/0/U3 | online(pt)   | 5        | 0.00         | 1336          | 0       | N   |
| 001e.6bfb.194e | 2.99.81.32 | C7/0/0/p  | p-online(pt) | 6        | -0.50        | 1422          | 0       | N   |
| 00e0.6f8b.a888 | 2.99.81.31 | C7/0/0/U3 | online(pt)   | 7        | 0.50         | 1427          | 0       | N   |
| 001e.6bfb.1538 | 2.99.81.38 | C7/0/0/p  | p-online(pt) | 8        | 0.00         | 1423          | 0       | N   |
| 001e.6bfb.0d22 | 2.99.81.29 | C7/0/0/p  | p-online(pt) | 9        | 0.00         | 1738          | 0       | N   |
| 001e.6bfb.1a7e | 2.99.81.30 | C7/0/0/p  | p-online(pt) | 10       | 0.00         | 1738          | 0       | N   |
| 0019.474a.c418 | 2.99.81.75 | C7/0/0/U1 | online(pt)   | 11       | 0.00         | 1335          | 0       | N   |
| 001e.6bfa.f58a | 2.99.81.9  | C7/0/0/p  | p-online(pt) | 12       | 0.00         | 1737          | 0       | N   |
| 0022.cef4.3fa2 | 2.99.81.24 | C7/0/0/p  | p-online(pt) | 13       | 0.00         | 1438          | 0       | N   |
| 001e.6bfb.1b72 | 2.99.81.10 | C7/0/0/p  | p-online(pt) | 14       | -0.50        | 1425          | 0       | N   |
| 0019.474a.c330 | 2.99.81.34 | C7/0/0/U0 | online(pt)   | 15       | 0.00         | 1028          | 0       | N   |
| 0023.be50.e578 | 2.99.81.17 | C7/0/0/UB | p-online(pt) | 16       | 0.00         | 1805          | 0       | N   |
| 0025.2e2d.784a | 2.99.81.28 | C7/0/0/UB | p-online(pt) | 17       | 0.50         | 1798          | 0       | N   |
| 0025.2e2d.748c | 2.99.81.26 | C7/0/0/UB | p-online(pt) | 18       | 0.00         | 1798          | 0       | N   |
| 001e.6bfa.f070 | 2.99.81.37 | C7/0/0/U3 | online(pt)   | 20       | 0.50         | 1735          | 0       | N   |
| 0019.474a.c422 | 2.99.81.20 | C8/0/0/U1 | online(pt)   | 1        | 0.50         | 1340          | 0       | N   |
| 0019.474a.c466 | 2.99.81.21 | C8/0/0/U1 | online(pt)   | 2        | 0.00         | 1334          | 0       | N   |
| 001e.6bfb.2e96 | 2.99.81.33 | C8/0/0/UB | w-online(pt) | 3        | 0.00         | 1738          | 0       | N   |

### Example of the show cable modem Command Output with a Cable Modem Ranging Class ID

The following example shows the sample output for the **verbose** option that displays the ranging class ID of a cable modem in Cisco IOS Release 12.2(33)SCH:

Router# **show cable modem 001c.eaa4.b5aa verbose**

```

MAC Address : 001c.eaa4.b5aa
IP Address : 192.168.0.5
IPv6 Address : ---
Dual IP : N
Prim Sid : 53
Host Interface : C5/1/0/UB
MD-DS-SG / MD-US-SG : 1 / 71
MD-CM-SG : 0xF0147
Primary Wideband Channel ID : 417 (Wi5/1/0:0)
Primary Downstream : In5/1/0:0 (RfId : 360)

```

## show cable modem

```

Wideband Capable : Y
RCP Index : 3
RCP ID : 00 10 00 10 04
Downstream Channel DCID RF Channel : 25 5/1/0:0
Downstream Channel DCID RF Channel : 26 5/1/0:1
Downstream Channel DCID RF Channel : 27 5/1/0:2
Downstream Channel DCID RF Channel : 28 5/1/0:3
Multi-Transmit Channel Mode : Y
Extended Upstream Transmit Power : 0dB
Upstream Channel : US0 US1 US2 US3
Ranging Status : sta sta sta sta
Upstream SNR (dB) : 36.12 36.12 36.12 36.12
Upstream Data SNR (dB) : -- -- -- --
Received Power (dBmV) : 0.50 0.50 0.50 0.50
Reported Transmit Power (dBmV) : 35.00 35.00 35.00 35.00
Peak Transmit Power (dBmV) : 53.00 53.00 53.00 53.00
Phy Max Power (dBmV) : 53.00 53.00 53.00 53.00
Minimum Transmit Power (dBmV) : 32.50 32.50 32.50 32.50
Timing Offset (97.6 ns) : 372 372 372 371
Initial Timing Offset : 372 116 116 116
Rng Timing Adj Moving Avg(0.381 ns) : -1 -1 0 -1
Rng Timing Adj Lt Moving Avg : -4 -3 -3 -4
Rng Timing Adj Minimum : -4 -4 -4 -4
Rng Timing Adj Maximum : 164 65671 65600 65516
Pre-EQ Good : 0 0 0 0
Pre-EQ Scaled : 0 0 0 0
Pre-EQ Impulse : 0 0 0 0
Pre-EQ Direct Loads : 0 0 0 0
Good Codewords rx : 648 515 617 564
Corrected Codewords rx : 0 0 0 0
Uncorrectable Codewords rx : 0 0 0 0
Phy Operating Mode : scdma* scdma* scdma* scdma*
sysDescr : Cisco DPC3000 DOCSIS 3.0 Cable Modem <<HW_REV: 1.1;
VENDOR: Cisco; BOOTR: 1.0.0.4; SW_REV: dpc3000-v303r2392-110520h; MODEL: DPC3000>>
Downstream Power : 1.70 dBmV (SNR = 38.90 dB)
MAC Version : DOC3.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= w-online, Security=disabled}
Capabilities : {Frag=N, Concat=N, PHS=Y}
Security Capabilities : {Priv=, EAE=Y, Key_len=}
L2VPN Capabilities : {L2VPN=Y, eSAFE=N}
Sid/Said Limit : {Max US Sids=8, Max DS Sids=24}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=Y}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
Number of CPE IPs : 0(Max CPE IPs = 16)

```

```

CFG Max-CPE : 16
Flaps : 0()
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 0 exhausted
Total US Flows : 1(1 active)
Total DS Flows : 1(1 active)
Total US Data : 2131 packets, 249036 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 2137 packets, 197622 bytes
Total DS Throughput : 304 bits/sec, 0 packets/sec
LB group ID assigned (index) : 2148467015 (36608)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Ranging Class ID : 0x2
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 2
Number of Multicast DSIDs Support : 24
MDF Capability Mode : 2
IGMP/MLD Version : IGMPv3
FCType10 Forwarding Support : Y
Features Bitmask : 0x0
Total Time Online : 1h13m (1h13m since last counter reset)
CM Initialization Reason : NO_PRIM_SF_USCHAN
CFG Max IPv6 CPE Prefix : 16 (-1 used)

```

#### Example of the show cable modem Command Output for upstream drop classifier (UDC) feature

Effective from Cisco IOS Release 12.2(33)SCG5, the **verbose** keyword displays the status of the Upstream Drop Classifier (UDC) feature for a specific cable modem. The “UDC Enabled” field displays ‘Y’ if it is enabled.

The following example shows the output of the **show cable modem** command with the **verbose** keyword for the UDC feature:

Router#**show cable modem 4458.2945.3004 verbose**

```

MAC Address : 4458.2945.3004
IP Address : 40.101.0.2
IPv6 Address : ---
Dual IP : N
Prim Sid : 2
Host Interface : C7/1/0/UB
MD-DS-SG / MD-US-SG : 1 / 1
MD-CM-SG : 0x4B0101
Primary Wideband Channel ID : 1057 (Wi7/1/0:0)
Primary Downstream : In7/1/0:2 (RfId : 842)
Wideband Capable : Y
RCP Index : 3
RCP ID : 00 10 00 00 08
Downstream Channel DCID RF Channel : 147 7/1/0:2
Downstream Channel DCID RF Channel : 145 7/1/0:0
Downstream Channel DCID RF Channel : 146 7/1/0:1
UDC Enabled : Y
Multi-Transmit Channel Mode : Y
Extended Upstream Transmit Power : 0dB
Upstream Channel : US2
Ranging Status : sta
Upstream SNR (dB) : 36.12
Upstream Data SNR (dB) : --
Received Power (dBmV) : -0.50
Reported Transmit Power (dBmV) : 36.00
Peak Transmit Power (dBmV) : 58.00
Phy Max Power (dBmV) : 58.00
Minimum Transmit Power (dBmV) : 18.00
Timing Offset (97.6 ns) : 1209
Initial Timing Offset : 1209
Rng Timing Adj Moving Avg(0.381 ns) : 255
Rng Timing Adj Lt Moving Avg : 238
Rng Timing Adj Minimum : -256
Rng Timing Adj Maximum : 256
Pre-EQ Good : 0
Pre-EQ Scaled : 0
Pre-EQ Impulse : 0
Pre-EQ Direct Loads : 0
Good Codewords rx : 665
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0
Phy Operating Mode : tdma*
sysDescr :
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ----- dB)
MAC Version : DOC3.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= w-online(pt), Security=assign(tek)}
Capabilities : {Frag=N, Concat=N, PHS=Y}
Security Capabilities : {Priv=BPI+, EAE=Y, Key_len=56,128}
L2VPN Capabilities : {L2VPN=N, eSAFE=N}
Sid/Said Limit : {Max US Sids=16, Max DS Sids=15}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=N}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
Number of CPE IPs : 0(Max CPE IPs = 5)
CFG Max-CPE : 10
Flaps : 1(Jun 4 22:05:34)
Errors : 0 CRCs, 0 HCSes

```



```

Stn Mtn Failures : 0 aborts, 1 exhausted
Total US Flows : 1(1 active)
Total DS Flows : 1(1 active)
Total US Data : 4 packets, 2502 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec
Total DS Data : 0 packets, 0 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
LB group ID assigned (index) : 2152399105 (51969)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Ranging Class ID : 0x1
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 2
Number of Multicast DSIDs Support : 16
MDF Capability Mode : 2
IGMP/MLD Version : IGMPv3
FCType10 Forwarding Support : Y
Features Bitmask : 0x0
Total Time Online : 1h29m (1h29m since last counter reset)
CM Initialization Reason : NO_PRIM_SF_USCHAN
CFG Max IPv6 CPE Prefix : 16 (-1 used)

```

**Note**

When the **verbose** keyword is used without a specific MAC address, the UDC Enabled status of each cable modem on the interface is displayed.

**Example of show cable modem verbose Command in the Cisco IOS Release 12.2(33)SCH1**

The following is a sample output for the **verbose** option that displays the channel IDs for 16 downstream channels of a cable modem:

Router# **show cable modem 68b6.fcfe.2285 verbose**

```

MAC Address : 68b6.fcfe.2285
IP Address : 192.168.0.8
IPv6 Address : 2001:DB8:10:1:9951:1972:33F9:9867
Dual IP : Y
Prim Sid : 235
Host Interface : C7/0/1/UB
MD-DS-SG / MD-US-SG : 1 / 1
MD-CM-SG : 0x3D0101
Primary Wideband Channel ID : 2305 (Wi7/0/0:0)
Primary Downstream : In7/0/0:3 (RfId : 1731)
Wideband Capable : Y
RCP Index : 3
RCP ID : 00 10 00 00 18

```

## show cable modem

```

Downstream Channel DCID RF Channel : 117 7/0/0:0
Downstream Channel DCID RF Channel : 118 7/0/0:1
Downstream Channel DCID RF Channel : 119 7/0/0:2
Downstream Channel DCID RF Channel : 120 7/0/0:3
Downstream Channel DCID RF Channel : 121 7/0/1:0
Downstream Channel DCID RF Channel : 122 7/0/1:1
Downstream Channel DCID RF Channel : 123 7/0/1:2
Downstream Channel DCID RF Channel : 124 7/0/1:3
Downstream Channel DCID RF Channel : 125 7/0/2:0
Downstream Channel DCID RF Channel : 126 7/0/2:1
Downstream Channel DCID RF Channel : 127 7/0/2:2
Downstream Channel DCID RF Channel : 128 7/0/2:3
Downstream Channel DCID RF Channel : 129 7/0/3:0
Downstream Channel DCID RF Channel : 130 7/0/3:1
Downstream Channel DCID RF Channel : 131 7/0/3:2
Downstream Channel DCID RF Channel : 132 7/0/3:3
Extended Upstream Transmit Power : 61dB
Multi-Transmit Channel Mode : Y
Number of US in UBG : 4
Upstream Channel : US0 US1 US2 US3
Ranging Status : sta sta sta sta
Upstream SNR (dB) : 36.12 36.12 36.12 36.12
Upstream Data SNR (dB) : -- -- -- --
Received Power (dBmV) : -0.50 -0.50 0.00 -0.50
Reported Transmit Power (dBmV) : 38.25 38.25 38.25 38.25
Peak Transmit Power (dBmV) : 61.00 61.00 61.00 61.00
Phy Max Power (dBmV) : 51.00 51.00 51.00 51.00
Minimum Transmit Power (dBmV) : 24.00 24.00 24.00 24.00
Timing Offset (97.6 ns) : 1348 1348 1348 1348
Initial Timing Offset : 1092 1092 1092 1348
Rng Timing Adj Moving Avg(0.381 ns) : 0 0 -1 0
Rng Timing Adj Lt Moving Avg : 644 737 644 0
Rng Timing Adj Minimum : 0 0 -256 0
Rng Timing Adj Maximum : 65536 65536 65536 256
Pre-EQ Good : 0 0 0 0
Pre-EQ Scaled : 0 0 0 0
Pre-EQ Impulse : 0 0 0 0
Pre-EQ Direct Loads : 0 0 0 0
Good Codewords rx : 25 30 36 67
Corrected Codewords rx : 0 0 0 0
Uncorrectable Codewords rx : 0 0 0 0
Phy Operating Mode : atdma* atdma* atdma* atdma*
sysDescr :
Downstream Power : 0.00 dBmV (SNR = ---- dB)
MAC Version : DOC3.0
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : Y
Modem Status : {Modem= w-online, Security=disabled}
Capabilities : {Frag=N, Concat=N, PHS=Y}
Security Capabilities : {Priv=, EAE=Y, Key_len=}
L2VPN Capabilities : {L2VPN=Y, eSAFE=Y}
Sid/Said Limit : {Max US Sids=8, Max DS Sids=64}
Optional Filtering Support : {802.1P=N, 802.1Q=N, DUT=Y}
Transmit Equalizer Support : {Taps/Symbol= 1, Num of Taps= 24}
Number of CPE : 1(Max CPE = 16)
Number of CPE IPs : 0(Max CPE IPs = 16)
CFG Max-CPE : 16
Flaps : 0()
Errors : 0 CRCs, 0 HCSes
Stn Mtn Failures : 0 aborts, 0 exhausted
Total US Flows : 1(1 active)
Total DS Flows : 1(1 active)
Total US Data : 29 packets, 8048 bytes
Total US Throughput : 0 bits/sec, 0 packets/sec

```

```

Total DS Data : 1 packets, 275 bytes
Total DS Throughput : 0 bits/sec, 0 packets/sec
LB group ID assigned (index) : 2151481601 (48385)
LB group ID in config file (index) : N/A (N/A)
LB policy ID : 0
LB policy ID in config file : 0
LB priority : 0
Tag :
Required DS Attribute Mask : 0x0
Forbidden DS Attribute Mask : 0x0
Required US Attribute Mask : 0x0
Forbidden US Attribute Mask : 0x0
Service Type ID :
Service Type ID in config file :
Ranging Class ID : 0x2
Active Classifiers : 0 (Max = NO LIMIT)
CM Upstream Filter Group : 0
CM Downstream Filter Group : 0
CPE Upstream Filter Group : 0
CPE Downstream Filter Group : 0
DSA/DSX messages : permit all
Voice Enabled : NO
DS Change Times : 0
Boolean Services : 2
Number of Multicast DSIDs Support : 63
MDF Capability Mode : 2
IGMP/MLD Version : MLDv2
FCType10 Forwarding Support : Y
Features Bitmask : 0x0
Total Time Online : 08:06 (08:06 since last counter reset)
CM Initialization Reason : T4_EXPIRED
CFG Max IPv6 CPE Prefix : 16 (-1 used)

```

### Example of show cable modem verbose Command for Displaying the Number of IPv4, IPv6 Addresses and the Maximum Value for a Cable Modem in the Cisco IOS Release 12.2(33)SCH1

The following is a sample output for the **verbose** option that displays the number of IPv4, IPv6 with the maximum value per cable modem:

```

Router# show cable modem 00C0.7bb3.fcd1 verbose | include Max

Phy Max Power (dBmV) : 57.00
Rng Timing Adj Maximum : 0
Sid/Said Limit : {Max US Sids=16, Max DS Sids=15}
Number of CPE : 6(Max CPE = 16)
Number of CPE IPs : 4(Max CPE IPs = 16)
Number of CPE IPv6 : 4(Max CPE IPv6 = 10)
CFG Max-CPE : 16
Active Classifiers : 0 (Max = NO LIMIT)
CFG Max IPv6 CPE Prefix : 10 (-1 used)

```

Table 89 describes the significant fields shown in the display.

**Table 89** *show cable modem Field Descriptions*

| Field        | Description                                               |
|--------------|-----------------------------------------------------------|
| MAC Address  | MAC address for the CM.                                   |
| IP Address   | IP address that the DHCP server has assigned to the CM.   |
| IPv6 Address | IPv6 address that the DHCP server has assigned to the CM. |

**Table 89** *show cable modem Field Descriptions (continued)*

| Field                              | Description                                                                                                                                                                                                                                                                                                          |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dual IP                            | Support of dual IP for both IPv4 and IPv6 addressing.                                                                                                                                                                                                                                                                |
| I/F, Interface                     | Cable interface line card providing the upstream for this CM.                                                                                                                                                                                                                                                        |
| sysDescr                           | Vendor and model of the cable modem, as reported by the cable modem. This field displays a value only when the <b>cable modem remote-query</b> command is configured.                                                                                                                                                |
| Upstream Power<br>Downstream Power | Upstream and Downstream Power fields are displayed only if the CM remote-query feature has been enabled using the <b>cable modem remote-query</b> command. Upstream Power displays the cable modem transmit level in dBmV, and Downstream Power displays the dBmV level received at the CM, as measured by the CMTS. |
| MAC State                          | Current state of the MAC layer.                                                                                                                                                                                                                                                                                      |
| Prim SID                           | Primary SID assigned to this CM.                                                                                                                                                                                                                                                                                     |
| Host Interface                     | Host interface name.                                                                                                                                                                                                                                                                                                 |
| Primary Wideband Channel ID        | Bonding group ID of the wideband interface assigned to the CM.                                                                                                                                                                                                                                                       |
| MD-DS-SG                           | MAC Domain Downstream Service Group, the downstream channels of a single MAC domain that reach the cable modem.                                                                                                                                                                                                      |
| DSID                               | Downstream Service Identifier.                                                                                                                                                                                                                                                                                       |
| Primary Downstream                 | Primary downstream channel assigned to the CM.                                                                                                                                                                                                                                                                       |
| Wideband Capable                   | Cable modem is wideband-capable or not.                                                                                                                                                                                                                                                                              |
| Downstream Channel DCID RF Channel | Downstream channel and channel ID used by a CM.                                                                                                                                                                                                                                                                      |
| Multi-Transmit Channel Mode        | Cable modem is in MTC mode or not.                                                                                                                                                                                                                                                                                   |
| UDC Enabled                        | Upstream Drop Classifier enabled or disabled. Displays 'Y' for enabled state and 'N' for disabled.                                                                                                                                                                                                                   |
| Upstream SNR                       | Upstream signal-to-noise ratio (SNR) for a particular cable modem (CM), in decibels (dB).                                                                                                                                                                                                                            |
| Upstream SM MER (dB)               | Upstream station maintenance (SM) modulation error ratio (MER) for a particular cable modem, in decibels (dB).                                                                                                                                                                                                       |
| Upstream Data MER (dB)             | Upstream modulation error ratio (MER) for a particular cable modem, in decibels (dB). This field is displayed only when RF adaptation is enabled.                                                                                                                                                                    |

**Table 89** *show cable modem Field Descriptions (continued)*

| Field                                                                                                                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RxPwr, Received Power                                                                                                       | <p>Average power in dBmV for the upstream channel symbol rate for the CM. With default settings, 0 dBmV is considered optimal, but a range of -1 to 1 dBmV is allowable. When cable modems exceed this range, older Cisco IOS releases supported a drop to as low as -2 dBmV. Recent Cisco IOS releases support a drop to as low as -4 dBmV.</p> <p>This field supports a resolution of 0.25 dBmV, but the dB resolution level for cable modems and for the Cisco CMTS are slightly higher—approximately 1.0 and 1.4 dB.</p> <p><b>Note</b> An asterisk (*) in the RxPwr column indicates that a power adjustment has been made for that CM. An exclamation point (!) indicates that the cable modem has reached its maximum power transmit level and cannot increase its power level further.</p>                                                                                |
| Timing Offset and Initial Timing Offset                                                                                     | <p>Timing offset for the CM, in ticks, as recognized on the CMTS. (A tick, as used here, is 6.25/64 microseconds.) This is the delay between when a particular cable modem is scheduled to make a transmission and when the CMTS actually receives it.</p> <p><b>Note</b> An exclamation point (!) in the Timing Offset column indicates that the cable modem has exceeded the maximum delay and timing offset specified by the <b>cable map-advance</b> command.</p> <p><b>Note</b> The timing offset shown here is typically smaller than the TX Time Offset value shown by the <b>show cable modem remote-query</b> command, because the latter value is the offset as recognized on the cable modem (which will include any internal delay between when the cable modem software begins the transmission and when the bits actually appear on the local cable interface).</p> |
| Reported Transmit Power (dBmV)                                                                                              | Reported Transmit Power level by the cable modem for each upstream channel. This applies only to the cable modems operating in the MTC mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Peak Transmit Power (dBmV)                                                                                                  | This is the maximum transmit power level that the cable modem in the MTC mode could transmit at for the upstream channel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Minimum Transmit Power (dBmV)                                                                                               | This is the minimum transmit power level that the cable modem in the MTC mode could transmit at for the upstream channel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Rng Timing Adj Moving Avg(0.381 ns):<br>Rng Timing Adj Lt Moving Avg:<br>Rng Timing Adj Minimum:<br>Rng Timing Adj Maximum: | A Cisco CMTS router tracking variables to see relative timing offset adjustments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Pre-EQ Good :<br>Pre-EQ Scaled :<br>Pre-EQ Impulse:<br>Pre-EQ Direct Loads                                                  | Equalizer statistics counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Table 89** *show cable modem Field Descriptions (continued)*

| Field                          | Description                                                                                                                                                                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Good Codewords rx              | Good code words for a particular upstream channel. This counter is reset during interface reset.                                                                                                                                                                                                                          |
| Corrected Codewords rx         | Correctable code words for a particular upstream channel. This counter is reset during interface reset.                                                                                                                                                                                                                   |
| Uncorrectable Codewords rx     | Uncorrectable code words for a particular upstream channel. This counter is reset during interface reset.                                                                                                                                                                                                                 |
| sysDescr                       | Identifies the vendor and model of the cable modem, as reported by the cable modem. This field displays a value only when the cable modem remote-query.                                                                                                                                                                   |
| Num CPEs, CFG Max-CPE          | Indicates the number of CPE devices for which the cable modem is providing services.                                                                                                                                                                                                                                      |
| Number of CPE IPs              | Indicates the maximum number of IP addresses assigned to CPE devices behind this CM, as configured by the <b>cable max-hosts</b> command.                                                                                                                                                                                 |
| Ver, MAC Version               | Displays the maximum supported version of DOCSIS that the cable modem supports (DOCSIS 1.0, DOCSIS 1.1, DOCSIS 2.0).                                                                                                                                                                                                      |
| QoS Prov, QoS Provisioned Mode | Displays the version of DOCSIS that the cable modem currently is provisioned for (DOCSIS 1.0, DOCSIS 1.1, DOCSIS 2.0).                                                                                                                                                                                                    |
| Enable DOCSIS 2.0 Mode         | Indicates that the cable modems are allowed to come online when in mixed-mode environments such as DOCSIS 1.0 TDMA, DOCSIS 1.1 TDMA and DOCSIS 2.0 ATDMA. This value is set to Y by default, unless the TLV 39 has been set to disabled (0) in the CM's Registration Request message or in the DOCSIS configuration file. |
| Phy Operating Mode             | Indicates the type of PHY-layer modulation that the cable modem is using: tdma or atdma. Also indicates the TDMA/ATDMA/SCDA mode that the cable modem is operating on a specific channel.                                                                                                                                 |
| Modem Status                   | Indicates the overall modem state and the security state of the primary SID.                                                                                                                                                                                                                                              |
| BPI Enbld, BPI                 | Indicates whether or not Baseline Privacy Interface (BPI) or BPI Plus (BPI+) encryption is enabled for the CM.                                                                                                                                                                                                            |
| DIP                            | Dual IP flag. Identifies whether or not ("Y" or "N") the cable modem or CPE supports both IPv4 and IPv6 addressing.                                                                                                                                                                                                       |
| Capabilities                   | Indicates what the cable modem reported as its capabilities in its Registration Request message: DOCSIS fragmentation, concatenation, packet header suppression (PHS), and BPI encryption.                                                                                                                                |
| Security Capabilities          | Indicates the privacy mode used by the cable modem (BPI or BPI+), early authentication and encryption (EAE) support, and the Key Length.                                                                                                                                                                                  |
| Optional Filtering Support     | Indicates whether 802.1P or 802.1Q packet filtering is enabled for this CM.                                                                                                                                                                                                                                               |
| Transmit Equalizer Support     | Number of taps being used for transmit equalization.                                                                                                                                                                                                                                                                      |
| Flaps                          | Number of flaps reported by this CM, with the date and time of the last flap within the parentheses.                                                                                                                                                                                                                      |
| Errors                         | Number of frame CRC and HCS errors reported for this CM.                                                                                                                                                                                                                                                                  |

**Table 89** *show cable modem Field Descriptions (continued)*

| Field                             | Description                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stn Mtn Failures                  | Number of station maintenance (cable keepalive) messages that the CMTS sent to this cable modem but did not receive any reply.                                                                                                                                                                                                                       |
| Total US Flows                    | Total number of upstream service flows, with the number of active service flows within the parentheses.                                                                                                                                                                                                                                              |
| Total DS Flows                    | Total number of downstream service flows, with the number of active service flows within the parentheses.                                                                                                                                                                                                                                            |
| Total US Data                     | Total data this cable modem has transmitted on the upstream, in packets and bytes.                                                                                                                                                                                                                                                                   |
| Total US Throughput               | Calculated throughput for this cable modem on the upstream, if available.                                                                                                                                                                                                                                                                            |
| Total DS Data                     | Total data this cable modem has received on the downstream, in packets and bytes.                                                                                                                                                                                                                                                                    |
| Total DS Throughput               | Calculated throughput for this cable modem on the downstream, if available.                                                                                                                                                                                                                                                                          |
| Active Classifiers                | Current number of active classifiers for this CM, with the maximum number of allowable classifiers for this cable modem within the parentheses.                                                                                                                                                                                                      |
| CM Required Attribute             | Indicates the current required attribute-mask value.                                                                                                                                                                                                                                                                                                 |
| CM Forbidden Attribute            | Indicates the current forbidden attribute-mask value.                                                                                                                                                                                                                                                                                                |
| DSA/DSX messages                  | Indicates whether dynamic service changes (DSX) from the cable modem are permitted (permit all) or disallowed (reject all).                                                                                                                                                                                                                          |
| Voice Enabled                     | Indicates whether the cable modem is voice-enabled.                                                                                                                                                                                                                                                                                                  |
| Number of Multicast DSIDs Support | Indicates the total number of supported multicast DSIDs.                                                                                                                                                                                                                                                                                             |
| FCType10 Forwarding Support       | Indicates FCType10 Forwarding Support.                                                                                                                                                                                                                                                                                                               |
| Dynamic Secret                    | <p>Dynamically-generated shared secret (a 16-byte hexadecimal value) that was used in the cable modem's previous registration cycle. If the cable modem is currently offline, this field shows all zeroes.</p> <p><b>Note</b> This field displays a value only when the <b>cable dynamic-secret</b> command has been used on the CMTS interface.</p> |
| Total Time Online                 | Amount of time in days, hours, and minutes that this cable modem has been continuously online since it last registered with the CMTS. This field begins incrementing whenever the cable modem enters one of the online(x) MAC states, and is reset to 0 whenever the cable modem enters any other MAC state.                                         |
| Event                             | Event type.                                                                                                                                                                                                                                                                                                                                          |
| TID                               | Transaction identifier.                                                                                                                                                                                                                                                                                                                              |
| Count                             | Number of valid messages received.                                                                                                                                                                                                                                                                                                                   |
| Dups                              | Number of duplicate messages received.                                                                                                                                                                                                                                                                                                               |
| Time                              | Time when last valid event was received.                                                                                                                                                                                                                                                                                                             |
| Len/Limit Pkts                    | Queue length and limit in packets.                                                                                                                                                                                                                                                                                                                   |
| Deqs Pkts                         | Dequeue packets.                                                                                                                                                                                                                                                                                                                                     |

**Table 89** *show cable modem Field Descriptions (continued)*

| Field              | Description                        |
|--------------------|------------------------------------|
| Drops Pkts         | Dropped packets.                   |
| CIR Kbps           | Committed information rate.        |
| MIR/PR Kbps        | Maximum information and peak rate. |
| Forwint            | Forwarding interface.              |
| SFID               | Service flow identifier.           |
| BE Queues          | Best effort queues.                |
| CIR Queues         | Committed information rate queues. |
| Low Latency Queues | Low latency queues.                |
| Ranging Class ID   | Upstream ranging class ID.         |

Table 107 shows the possible values for the MAC state field:

**Table 90** *Descriptions for the MAC State Field <sup>1</sup>*

| MAC State Value                                                                                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ranging Status Conditions for Devices Using IPv4 Addressing</b>                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| init(r1)                                                                                                                    | The cable modem sent initial ranging.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| init(r2)                                                                                                                    | The cable modem is ranging. The CMTS received initial ranging from the cable modem and has sent RF power, timing offset, and frequency adjustments to the CM.                                                                                                                                                                                                                                                                                                                                                   |
| init(rc)                                                                                                                    | <p>Ranging has completed.</p> <p><b>Note</b> If a cable modem appears to be stuck in this state, it could be that the cable modem is able to communicate successfully on the cable network, but that the upstream is at capacity and does not have any additional bandwidth to allow the cable modem to finish registration and come online. Either manually move one or more cable modems to other upstreams, or enable load balancing on the upstream using the <b>cable load-balance group</b> commands.</p> |
| <b>Early Authentication and Encryption</b>                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| assign(epk)                                                                                                                 | BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| assign(ept)                                                                                                                 | BPI is enabled and TEK is assigned. The registration messages will be encrypted.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Registration and Provisioning Status Conditions for Devices Using IPv4 Addressing</b>                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| If early authentication and encryption is used, the letter 's' is appended to these states to indicate secure registration. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| init(d)                                                                                                                     | The DHCP request was received, as DHCPDISCOVER. This also indicates that the first IP broadcast packet has been received from the CM.                                                                                                                                                                                                                                                                                                                                                                           |
| init(dr)                                                                                                                    | The DHCP request has been sent to the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



**Table 90** Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value                                                                                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| init(i)                                                                                                                     | The cable modem has received the DHCPOFFER reply (DHCPACK) from the DHCP server that has assigned an IP address to the modem, but the modem has not yet replied with a DHCPREQUEST message requesting that particular IP address, nor has it sent an IP packet with that IP address.<br><br><b>Note</b> If a cable modem appears to be stuck in this state, the cable modem has likely received the DHCPOFFER reply from the DHCP server, but this reply might have contained one or more invalid options for that particular CM. |
| init(io)                                                                                                                    | The Cisco CMTS has seen the DHCP offer as sent to the cable modem from the DHCP server that has assigned an IP address to the modem.                                                                                                                                                                                                                                                                                                                                                                                              |
| init(o)                                                                                                                     | The cable modem has begun to download the option file (DOCSIS configuration file) using the Trivial File Transfer Protocol (TFTP), as specified in the DHCP response. If the cable modem remains in this state, it indicates that the download has failed.                                                                                                                                                                                                                                                                        |
| init(t)                                                                                                                     | Time-of-day (TOD) exchange has started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Registration and Provisioning Status Conditions for Devices Using IPv6 Addressing</b>                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| If early authentication and encryption is used, the letter 's' is appended to these states to indicate secure registration. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| init6(s)                                                                                                                    | The Cisco CMTS router has seen the DHCPv6 SOLICIT message from the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| init6(a)                                                                                                                    | The Cisco CMTS router has seen the ADVERTISE message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| init6(r)                                                                                                                    | The Cisco CMTS router has seen the REQUEST response from the cable modem to the DHCPv6 server.                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| init6(i)                                                                                                                    | The Cisco CMTS router has seen the REPLY message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| init6(o)                                                                                                                    | The Cisco CMTS router has seen the REQUEST message from the cable modem to the TFTP server.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| init6(t)                                                                                                                    | The Cisco CMTS router has seen the REQUEST message from the cable modem to the TOD server.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Non-error Status Conditions</b>                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| cc(r1)                                                                                                                      | The cable modem had registered and was online, but has received a Downstream Channel Change (DCC) or Upstream Channel Change (UCC) request message from the CMTS. The cable modem has begun moving to the new channel, and the CMTS has received the CM's initial ranging on the new downstream or upstream channel. At the MAC layer, the cable modem is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                    |
| cc(r2)                                                                                                                      | This state should normally follow cc(r1) and indicates that the cable modem has finished its initial ranging on the new channel, and is currently performing continuous ranging on the new channel. At the MAC layer, the cable modem is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                                                                                                     |
| offline                                                                                                                     | The cable modem is considered offline (disconnected or powered down).                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

**Table 90** Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| resetting       | The cable modem is being reset and will shortly restart the ranging and registration process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| online          | The cable modem has registered and is enabled to pass data on the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| online(d)       | <p>The cable modem registered, but network access for CPE devices using this cable modem has been disabled through the DOCSIS configuration file. The cable modem does not forward traffic to or from the CPE devices, but the CMTS can continue to communicate with the cable modem using DOCSIS messages and IP traffic (such as SNMP commands).</p> <p><b>Note</b> If BPI was enabled in the DOCSIS configuration file sent to the CM, assume that the cable modem is using BPI encryption, unless other messages show that the BPI negotiation and key assignments have failed.</p> |
| online(pk)      | <p>The cable modem registered, but network access for CPE devices using this cable modem has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and KEK is assigned.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pk) states.</p>                                                                                                                                                                                                                                                                                              |
| online(pt)      | <p>The cable modem registered, but network access for CPE devices using this cable modem has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pt) states.</p>                                                                                                                                                                                                                                                       |
| online(pk)      | The cable modem registered, BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| online(pt)      | <p>The cable modem registered, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> If network access was disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) instead of online(pt) even when BPI encryption is enabled and operational.</p>                                                                                                                                                                                                      |
| expire(epk)     | Early authentication and encryption is enabled, KEK was assigned, but the current KEK expired before the cable modem could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| expire(pk)      | <p>The cable modem registered, but network access for CPE devices using this cable modem has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, KEK was assigned, but the current KEK expired before the cable modem could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pk) states.</p>                                                                                                                                                                                                   |
| expire(ept)     | Early authentication and encryption is enabled, TEK was assigned, but the current TEK expired before the cable modem could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table 90** Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| expire(ptd)                    | <p>The cable modem registered, but network access for CPE devices using this cable modem has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, TEK was assigned, but the current TEK expired before the cable modem could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Error Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| reject(m)                      | <p>The cable modem attempted to register but registration was refused due to a bad Message Integrity Check (MIC) value. This also could indicate that the shared secret in the DOCSIS configuration file does not match the value configured on the CMTS with the <b>cable shared-secret</b> command.</p> <p>In Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases, this could also indicate that the <b>cable tftp-enforce</b> command has been used to require that a cable modem attempt a TFTP download of the DOCSIS configuration file before registering, but the cable modem did not do so.</p>                                                                                                                                                                                                                                              |
| reject(c)                      | <p>The cable modem attempted to register, but registration was refused due to a number of possible errors:</p> <ul style="list-style-type: none"> <li>• The cable modem attempted to register with a minimum guaranteed upstream bandwidth that would exceed the limits imposed by the <b>cable upstream admission-control</b> command.</li> <li>• The cable modem has been disabled because of a security violation.</li> <li>• A bad class of service (COS) value in the DOCSIS configuration file.</li> <li>• The cable modem attempted to create a new COS configuration but the CMTS is configured to not permit such changes.</li> <li>• The cable modem failed the timestamp check for its DOCSIS configuration file. (This could indicate a possible theft-of-service attempt, or a problem with the synchronization of the clocks on the cable modem and CMTS.)</li> </ul> |
| reject(epk)                    | Early authentication and encryption is enabled, KEK key assignment is rejected, and the modem has not been authenticated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| reject(pk)                     | KEK key assignment is rejected, and the modem has not been authenticated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| reject(pkd)                    | <p>The cable modem registered, but network access for CPE devices using this cable modem has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pk) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| reject(ept)                    | Early authentication and encryption is enabled, TEK key assignment is rejected, and BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| reject(ptd)                    | <p>The cable modem registered, but network access for CPE devices using this cable modem has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Table 90** Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value | Description                                                                                                                                                                                                                                                                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| reject(ts)      | The cable modem attempted to register, but registration failed because the TFTP server timestamp in the cable modem registration request did not match the timestamp maintained by the CMTS. This might indicate that the cable modem attempted to register by replaying an old DOCSIS configuration file used during a prior registration attempt. |
| reject(ip)      | The cable modem attempted to register, but registration failed because the IP address in the cable modem request did not match the IP address that the TFTP server recorded when it sent the DOCSIS configuration file to the CM. IP spoofing could be occurring.                                                                                   |
| reject(na)      | The cable modem attempted to register, but registration failed because the cable modem did not send a Registration-Acknowledgement (REG-ACK) message in reply to the Registration-Response (REG-RSP) message sent by the CMTS. A Registration-NonAcknowledgement (REG-NACK) is assumed.                                                             |

1. The CM MAC state field can also be retrieved using SNMP by getting the value of the cdxCmtsable modemstatusValue object in the CISCO-DOCS-EXT-MIB.

The following symbols appended to the modem state indicate a special condition:

An exclamation mark (!) indicates that the **cable dynamic-secret** command is used with either the **mark** or **reject** keyword and the cable modem has failed the dynamic secret authentication check.

An ampersand (&) indicates that the cable modem has registered using a self-signed certificate. This is inherently not secure and can be avoided by negating the **cable privacy accept-self-signed-certificate** command.

The asterisk (\*) indicates that the cable modem does not satisfy the BPI+ policy and the data traffic is blocked. The **cable privacy bpi-plus-policy** command enforces this requirement.

A hash sign (#) indicates that the cable modem is using an unknown configuration file. To solve this problem, use the **cable dynamic-secret** command with the **reject** keyword. This will reject registration for cable modems with DOCSIS configuration files.



In Cisco IOS Releases 12.1(20)EC, 12.2(15)BC1, and earlier releases, when network access is disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) even if BPI encryption fails.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                              | Description                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                  |
| <b>show cable modem access-group</b> | Displays the access groups for the cable modems on a particular cable interface.                                  |
| <b>show cable modem calls</b>        | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |

| Command                              | Description                                                                                                                                      |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>show cable modem classifiers</b>  | Displays information about the classifiers for a particular CM.                                                                                  |
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                                               |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more cable modems.                                                                                   |
| <b>show cable modem counters</b>     | Displays downstream and upstream traffic counters for one or more cable modems.                                                                  |
| <b>show cable modem cpe</b>          | Displays the CPE devices accessing the cable interface through a particular CM.                                                                  |
| <b>show cable modem domain-name</b>  | Updates the cable-specific DNS cache and display the domain name for specified cable modems and CPE behind a cable modem on a Cisco CMTS router. |
| <b>show cable modem errors</b>       | Displays error statistics for one or more cable modems.                                                                                          |
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more cable modems.                                                                                      |
| <b>show cable modem ipv6</b>         | Displays IPv6 information for specified cable modems and CPE behind a cable modem on a Cisco CMTS router.                                        |
| <b>show cable modem mac</b>          | Displays MAC layer information for one or more cable modems.                                                                                     |
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems.                                                                 |
| <b>show cable modem offline</b>      | Displays a list of the cable modems that are marked as offline with the Cisco CMTS.                                                              |
| <b>show cable modem partial-mode</b> | Displays information about the cable modems that are in upstream and downstream partial service mode.                                            |
| <b>show cable modem phy</b>          | Displays the DOCSIS PHY layer information for one or more cable modems.                                                                          |
| <b>show cable modem qos</b>          | Displays quality of service (QoS) and service flow information for a particular CM.                                                              |
| <b>show cable modem registered</b>   | Displays a list of the cable modems that are marked as registered with the Cisco CMTS.                                                           |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                                                                                      |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                                                             |
| <b>show cable modem summary</b>      | Displays a summary of cable modems on one or more cable interfaces.                                                                              |
| <b>show cable modem unregistered</b> | Displays a list of the cable modems that are marked as unregistered with the Cisco CMTS.                                                         |
| <b>show cable modem vendor</b>       | Displays the vendor name or Organizational Unique Identifier (OUI) for the cable modems on each cable interface.                                 |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                                                                                   |
| <b>show interface cable modem</b>    | Displays information about the cable modems connected to a particular cable interface.                                                           |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                                                            |

# show cable modem access-group

To display the access groups for the CMs on a particular cable interface, use the **show cable modem access-group** command in privileged EXEC mode.

**Cisco uBR7100 series and Cisco uBR7200 series routers:**

```
show cable modem [ip-address | cable {slot/port | slot/cable-interface-index} [upstream port
[logical-channel-index]] | mac-address] access-group
```

**Cisco uBR10012 routers:**

```
show cable modem cable {slot/subslot/port | slot/subslot/cable-interface-index} [upstream port
[logical-channel-index]] access-group
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) Access-group information displayed for the CM with the specified IP address. (Cisco uBR7100 series and Cisco uBR7200 series routers only.)                                                                                                                                                                                                                                                                                                                                         |
| <i>mac-address</i>           | (Optional) Access-group information displayed for the CM with the specified MAC address. (Cisco uBR7100 series and Cisco uBR7200 series routers only.)                                                                                                                                                                                                                                                                                                                                        |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <i>upstream port</i>         | (Optional) Displays information for all CMs using this specific upstream. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports on the cable interface line card.                                                                                                                                                                              |

|                              |                                                                                                                        |
|------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                         |
| <b>access-group</b>          | Displays the access groups for the CMs and their associated hosts and other customer premises equipment (CPE) devices. |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                  |
|-------------|-------------------------------------------------------------------------------------------------------------------------------|
| 11.3XA      | This command was introduced.                                                                                                  |
| 12.2(4)BC1  | Support for this command was added for the Cisco uBR10012 router, but only to display access groups on a per-interface basis. |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                            |
| 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                                               |

**Usage Guidelines**

This command displays information only for CMs. To display information for both CMs and their associated hosts and other customer premises equipment (CPE) devices, use the **show cable device access-group** command. To display information only for hosts, use the **show cable host access-group** command.

If an SNMP manager is requesting information about CM or CPE devices at the same time that this command is given, the command displays the following error message:

No information is available, please try later.

Wait until the SNMP retrieval is done and retry the CLI command.

**Note**

Also see the information about this command's behavior in a Hot Standby Connection-to-Connection Protocol (HCCP) configuration.

**Examples**

The following example shows sample output for the show cable modem access-group command on a Cisco uBR7200 series router for a particular CM:

```
Router# show cable modem 0010.7bb3.fcd1 access-group
```

```
MAC Address IP Address Access-group
0010.7bb3.fcd1 10.20.113.2 34
```

```
Upstream Power : 42 dBmV (SNR = 10 dBmV)
Downstream Power : 15 dBmV (SNR = 15 dBmV)
```

```
Router#
```

**Note**

The upstream and downstream power fields will be displayed only if the CM remote-query feature has been enabled using the **cable modem remote-query** command.

The following example shows sample output for the **show cable modem access-group** command for a particular cable interface on a Cisco uBR10012 router:

```
Router# show cable modem c8/1/0 access-group
```

```
MAC Address IP Address Access-group
0050.7366.1243 22.1.1.11 1
0002.b970.0027 23.1.1.10 1
0006.5314.858d 22.1.1.10 N/A
```

```
Router#
```

Table 0-91 describes the fields that are shown in the **show cable modem access-group** display:

**Table 0-91** Descriptions for the show cable modem access-group Fields

| Field        | Description                                                           |
|--------------|-----------------------------------------------------------------------|
| MAC Address  | The MAC address for the CM.                                           |
| IP Address   | The IP address that the DHCP server has assigned to the CM.           |
| Access-group | Displays the access group name or number in use (if any) for this CM. |



**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                               | Description                                                                                                       |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>             | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                  |
| <b>show cable device access-group</b> | Displays a list of CMs and their CPE devices, along with their access groups.                                     |
| <b>show cable host access-group</b>   | Displays a list of hosts and other CPE devices, along with their access groups.                                   |
| <b>show cable modem</b>               | Displays information for the registered and unregistered CMs.                                                     |
| <b>show cable modem calls</b>         | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem classifiers</b>   | Displays information about the classifiers for a particular CM.                                                   |
| <b>show cable modem cnr</b>           | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                |
| <b>show cable modem connectivity</b>  | Displays connectivity statistics for one or more CMs.                                                             |
| <b>show cable modem cpe</b>           | Displays the CPE devices accessing the cable interface through a particular CM.                                   |
| <b>show cable modem errors</b>        | Displays error statistics for one or more CMs.                                                                    |
| <b>show cable modem flap</b>          | Displays flap list statistics for one or more cable modems.                                                       |



| Command                              | Description                                                                      |
|--------------------------------------|----------------------------------------------------------------------------------|
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems. |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                      |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                             |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                   |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.    |
| <b>show interface cable sid</b>      | Displays cable interface information.                                            |

# show cable modem auth-profile

To display the multicast authorization profile, and profile group information for a particular IP address or MAC address, use the **show cable modem auth-profile** command in privileged EXEC mode.

```
show cable modem [ip-address | mac-address] [auth-profile]
```

|                    |                     |                                                                                                                                                                     |
|--------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>ip-address</i>   | (Optional) IPv4 or IPv6 address of a CM that is displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.        |
|                    | <i>mac-address</i>  | (Optional) MAC address of a CM that is displayed. You can also specify the MAC address for a CPE device behind a CM, and information for that CM will be displayed. |
|                    | <b>auth-profile</b> | (Optional) Displays the multicast authorization profile, and profile group information.                                                                             |

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCB    | This command was introduced. |

|                  |                                                                                                     |
|------------------|-----------------------------------------------------------------------------------------------------|
| Usage Guidelines | Use this command to display the multicast authorization profile, and the profile group information. |
|------------------|-----------------------------------------------------------------------------------------------------|

Examples

The following sample output of the **show cable modem auth-profile** command shows the multicast authorization profile and profile group display for a particular ip-address or mac-address.

```
Router# show cable modem 30.17.2.23 auth-profile

Multicast Profile Information for 0025.2e34.4377
IP: 30.17.2.121
Multicast Profile Group # : default

Router#
```

|                  |                                           |                                                                                                                   |
|------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Related Commands | <b>Command</b>                            | <b>Description</b>                                                                                                |
|                  | <b>show cable multicast authorization</b> | Displays the list of defined multicast authorization profiles and all CMs associated with corresponding profiles. |

| Command                          | Description                                                                                                |
|----------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>show cable multicast dsid</b> | Displays the entire multicast downstream service identifier (DSID) database content.                       |
| <b>show cable multicast qos</b>  | Displays the configuration information for MQoS (Group-Config, Group-QoS-Config, Group-Encryption-Config). |

# show cable modem calls

To display voice call information for a particular CM, use the **show cable modem calls** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] calls
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn] calls
```

### Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                       |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                               |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <i>upstream port</i>         | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card.                                                                                                                                                           |

|                              |                                                                                                                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                      |
| <b>name</b> <i>fqdn</i>      | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |
| <b>calls</b>                 | Display voice call information for a CM.                                                                                                                                                                                                                            |

**Command Modes** Privileged EXEC (#)

| Command History | Release      | Modification                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC1 | Support for voice call information was added to the <b>show cable modem</b> command.                                                                                                                                                                                                                                                                                                         |
|                 | 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |
|                 | 12.2(33)SCE  | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                           |
|                 | 12.2(33)SCF  | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                              |

**Usage Guidelines** Using the keyword options, you can display IPv6 information by IP address (IPv4 or IPv6) of a particular CM, for all CMs associated with a specified cable interface, by MAC address of a CM, or by domain name of a CM.



**Note** In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

This command supports PacketCable and PacketCable MultiMedia (PCMM) information. Additional information for voice call support with PacketCable and PacketCable MultiMedia (PCMM) is available in the feature document *PacketCable and PacketCable Multimedia for the Cisco CMTS* available on Cisco.com:

**Examples** The following example shows sample output for the default **calls** option for a particular CM:

```
Router# show cable modem calls

Cable Modem Call Status Flags:
H: Active high priority calls
R: Recent high priority calls
```

## ■ show cable modem calls

V: Active voice calls (including high priority)

| MAC Address    | IP Address  | I/F     | Prim<br>Sid | CMCallStatus | LatestHiPriCall<br>(min:sec) |
|----------------|-------------|---------|-------------|--------------|------------------------------|
| 000f.66f8.a121 | 10.8.130.63 | C4/0/U0 | 175         | HV           | -                            |

## Related Commands

| Command                              | Description                                                                                                                |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                           |
| <b>show cable calls</b>              | Displays voice call history information and status for the PacketCable Emergency 911 Services Listing and History feature. |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                              |
| <b>show cable modem classifiers</b>  | Displays information about the classifiers for a particular CM.                                                            |
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                         |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                                                      |
| <b>show cable modem errors</b>       | Displays error statistics for one or more CMs.                                                                             |
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more cable modems.                                                                |
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems.                                           |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                                                                |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                                       |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                                                             |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                                              |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                                      |

# show cable modem classifiers

To display information about the classifiers for a particular CM, use the **show cable modem classifiers** command in privileged EXEC mode.

**show cable modem** {*ip-address* | *mac-address*} [*name fqdn*] **classifiers** [*cache* | *verbose*]

## Syntax Description

|                    |                                                                                                                                                                                                                                                                     |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>  | Specifies the IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, classifier information for that CM is displayed.                                                                                   |
| <i>mac-address</i> | Displays classifier information for the CM with the specified MAC address. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                       |
| <i>name fqdn</i>   | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |
| <b>cache</b>       | (Optional) Displays the classifiers in the cache maintained for each CM. (This cache is based on IP header field values and speeds up classifier lookups and reduces per-packet processing overhead.)                                                               |
| <b>verbose</b>     | (Optional) Displays detailed information for the CM classifiers.                                                                                                                                                                                                    |

## Command Modes

Privileged EXEC (#)

## Command History

| Release                  | Modification                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA                  | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                 |
| 12.1(4)CX and 12.2(4)BC1 | The number of matches field was added to this command, and the command was restricted to display information for a single CM at a time.                                                                                                                                                                                                                                                      |
| 12.2(33)SCA              | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |

## Usage Guidelines

This command displays classifier information for a particular CM, identified either by its IP address, MAC address, or domain name.



### Note

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Note**

For information about this command's behavior in a Hot Standby Connection-to-Connection Protocol (HCCP) configuration, see the "Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration" section of the **show cable modem** command.

**Examples**

The following example shows sample output for the default **classifiers** option for a particular CM:

```
Router# show cable modem 10.4.0.81 classifiers
```

| CfrId | SFID  | CM Mac Address | Direction  | State  | Priority | Matches |
|-------|-------|----------------|------------|--------|----------|---------|
| 6431  | 26120 | 0000.399f.a44f | upstream   | active | 128      | -       |
| 6429  | 26054 | 0000.399f.a44f | upstream   | active | 128      | -       |
| 6432  | 26121 | 0000.399f.a44f | downstream | active | 128      | 1182    |
| 6430  | 26055 | 0000.399f.a44f | downstream | active | 128      | 3934    |

```
Router#
```

[Table 92](#) describes the fields that are shown in the **show cable modem classifiers** display:

**Table 92** Descriptions for the show cable modem classifiers Fields

| Field          | Description                                                                             |
|----------------|-----------------------------------------------------------------------------------------|
| CfrID          | Classifier ID for the classifier that is being displayed.                               |
| SFID           | Service flow ID (SFID) for this classifier.                                             |
| CM MAC Address | MAC address for the CM.                                                                 |
| Direction      | Identifies whether this classifier applies to the downstream or the upstream direction. |
| State          | Classifier activation state: active or inactive.                                        |
| Priority       | Classifier rule priority value for this classifier.                                     |
| Matches        | Number of packets that have been matched to this service flow.                          |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                              | Description                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                  |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                     |
| <b>show cable modem calls</b>        | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                                             |



| Command                              | Description                                                                      |
|--------------------------------------|----------------------------------------------------------------------------------|
| <b>show cable modem errors</b>       | Displays error statistics for one or more CMs.                                   |
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more cable modems.                      |
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems. |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                      |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                   |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.    |
| <b>show interface cable sid</b>      | Displays cable interface information.                                            |

# show cable modem cnr

To display information about the upstream carrier-to-noise ratio (CNR) or signal-to-noise ratio (SNR) for a particular cable modem (CM), use the **show cable modem** command in privileged EXEC mode.

```
show cable modem {ip-address | mac-address | name fqdn} cnr
```

## Syntax Description

|                    |                                                                                                                                                                                                                                                                                     |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>  | IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a customer premise equipment (CPE) device behind a CM, classifier information for that CM is displayed.                                                                                    |
| <i>mac-address</i> | Classifier information for the CM with the specified MAC address. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                |
| <b>name fqdn</b>   | Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable domain name system (DNS) cache on the Cisco CMTS router. |

## Command Modes

Privileged EXEC (#)

## Command History

This table includes the following release-specific history entries:

- [BC Release](#)
- [CX Release](#)
- [SC Release](#)

| BC Release   | Modification                                                                                           |
|--------------|--------------------------------------------------------------------------------------------------------|
| 12.2(4)BC2   | The command was changed to its current form of <b>show cable modem cnr</b> .                           |
| 12.2(8)BC2   | Support was added for the Cisco uBR-LCP2-MC16S cable interface line card on the Cisco uBR10012 router. |
| 12.2(11)BC3  | Support was added for the Cisco uBR10-MC5X20S cable interface line cards on the Cisco uBR10012 router. |
| 12.2(15)BC1  | If a cable modem is offline, its CNR value is now shown as “-----”.                                    |
| 12.2(15)BC2  | Support was added for the Cisco uBR-MC16U/X and Cisco uBR-MC5X20U cable interface line cards.          |
| 12.3(17a)BC2 | Support was added for the Cisco uBR-MC5X20H cable interface line card.                                 |

| CX Release  | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(7)CX1  | This command was introduced (in the form of <b>show cable modem snr</b> ) for Cisco uBR7200 series routers using the Cisco uBR-MC16S cable interface line card.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 12.2(15)CX  | Support was added for the Cisco uBR-MC28U/X cable interface line cards on the Cisco uBR7246VXR router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SC Release  | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 12.2(33)SCA | <p>This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes:</p> <ul style="list-style-type: none"> <li>• Support for the Cisco uBR7225VXR router was added.</li> <li>• Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>• The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> <li>• The following new initialization states were added to show initialization of CMs and CPEs supporting IPv6: <ul style="list-style-type: none"> <li>– init6(s)—Cisco CMTS router has seen SOLICIT message.</li> <li>– init6(a)—Cisco CMTS router has seen ADVERTISE message.</li> <li>– init6(r)—Cisco CMTS router has seen REQUEST message.</li> <li>– init6(i)—Cisco CMTS router has seen REPLY message.</li> <li>– init6(o)—Cisco CMTS router has seen version 6 TFTP request.</li> <li>– init6(t)—Cisco CMTS router has seen version 6 TOD request.</li> </ul> </li> </ul> |
| 12.2(33)SCC | The output of this command was modified to show the CNR and SNR information for multiple upstream connections providing service to a single CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 12.2(33)SCF | The output of this command was modified to show expected power level, received carrier power level, and CNR information for all the upstream channels providing services to a CM. The SNR information is no longer displayed in the output of this command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

### Usage Guidelines

The **show cable modem cnr** command displays information on the current CNR value for cable modems that are using interfaces on the following cable line cards:

- Cisco uBR-MC16U/X
- Cisco uBR-MC28U/X
- Cisco uBR10-MC5X20S/U/H
- Cisco uBR-E-28U
- Cisco uBR-E-16U

For cable modems on all other interfaces, this command displays information about the current SNR value of the modem.

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the Cisco CMTS router before any domain name can be used as part of a cable command.

Starting Cisco IOS Release 12.2(33)SCF, carrier-to-noise plus interference ratio (CNR [CNR]) can be measured for all upstream channels irrespective of whether spectrum management is enabled or not for the upstream channels. Therefore, the output of the **show cable modem cnr** command displays only the CNR (CNR) values for all the upstream channels for a specific cable modem.

### Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address cnr** command might not show a particular cable modem until the Cisco CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address cnr** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when the HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond with a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.



#### Tip

In Cisco IOS Release 12.1(12)EC, Cisco IOS Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

### Examples

The following example is a sample output of the **show cable modem cnr** command for a CM:

```
Router# show cable modem 10.20.114.34 cnr
```

| MAC Address    | IP Address   | I/F         | MAC State | Prim Sid | snr/cnr (db) |
|----------------|--------------|-------------|-----------|----------|--------------|
| 00d0.ba77.7595 | 10.20.114.34 | Cable3/0/U5 | online    | 1        | 45.00        |

The following example is a sample output of the **show cable modem cnr** command after an HCCP switchover. The CNR value is missing until traffic is sent to the cable modem (in this case using the **ping** command).

```
Router# show cable modem 10.10.10.46 cnr
```

| MAC Address    | IP Address  | I/F       | MAC State | Prim Sid | snr/cnr (db) |
|----------------|-------------|-----------|-----------|----------|--------------|
| 0002.fd22.aadf | 10.10.10.46 | C5/1/0/U5 | online    | 1970     | ----         |

```
Router# ping 10.10.10.46
```

```
Router# show cable modem 10.10.10.46 cnr
```

| MAC Address    | IP Address  | I/F       | MAC State | Prim Sid | snr/cnr (db) |
|----------------|-------------|-----------|-----------|----------|--------------|
| 0002.fd22.aadf | 10.10.10.46 | C5/1/0/U5 | online    | 1970     | 42.00        |

The following example is a sample output of the **show cable modem cnr** command for all upstream ports providing service to a specified cable modem in Cisco IOS Release 12.2(33)SCC:

```
Router# show cable modem 0014.f8c1.fd1a cnr
```

| MAC Address    | IP Address | I/F       | MAC State | SID | snr/cnr (dB) |
|----------------|------------|-----------|-----------|-----|--------------|
| 0014.f8c1.fd1a | 10.10.4.1  | C5/0/1/U0 | online    | 1   | 33           |
| 001e.6bfb.119a | 9.9.9.2    | C5/0/1/U1 | online    | 2   | 33           |
| 001e.6bfb.0f9e | 9.9.9.3    | C5/0/1/U2 | online    | 3   | 33           |
| 0019.474a.d4c4 | 9.9.9.4    | C5/0/1/U3 | online    | 4   | 33           |

The following example is a sample output of the **show cable modem cnr** command for an upstream port providing service to a specified cable modem in Cisco IOS Release 12.2(33)SCF:

```
Router# show cable modem 0022.cea4.f0fa cnr
```

| MAC Address    | IP Address | I/F        | MAC State | Prim Sid | ExPwr (dBmv) | RxPwr (dBmv) | cnr (dB) |
|----------------|------------|------------|-----------|----------|--------------|--------------|----------|
| 0022.cea4.f0fa | 10.10.1.62 | C8/1/14/U3 | w-online  | 78       | 0.0          | -0.50        | 23       |

[Table 93](#) describes the significant fields shown in the display:

**Table 93** *show cable modem cnr Field Descriptions*

| Field        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address  | MAC address of the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| IP Address   | IP address that the DHCP server has assigned to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| I/F          | Cable interface line card providing the upstream for this CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| MAC State    | Current state of the MAC layer (see <a href="#">Table 107</a> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Prim Sid     | Primary Sid assigned to this CM.<br><br>In Cisco IOS Release 12.2(33)SCC, this field is renamed to SID and represents multiple upstream connections with unique SIDs providing service to a single CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| ExPwr (dBmv) | Expected carrier power level, in decibel millivolts (dBmv).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| RxPwr (dBmv) | Received carrier power level, in decibel millivolts (dBmv).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| snr/cnr (db) | The current upstream CNR or SNR for this particular CM, in decibels (dB). In Cisco IOS Release 12.2(15)BC1 and later releases, this field shows "-----" for offline cable modems.<br><br><b>Note</b> You can also use the <b>show controllers cable</b> command to display the SNR or CNR for a cable interface line card, but this value is only an estimate because it uses a random sampling of modems to determine the average for the card at any particular time. The CNR value shown by the <b>show controllers cable</b> command can therefore appear to fluctuate compared to the individual values shown by the <b>show cable modem cnr</b> command. |

Table 107 shows the possible values for the MAC state field.

**Table 94** *MAC State Field Descriptions*<sup>1</sup>

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Registration and Provisioning Status Conditions for Devices Using IPv4 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| init(r1)                                                                                 | CM sent initial ranging.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| init(r2)                                                                                 | CM is ranging. The Cisco CMTS received initial ranging from the CM and has sent RF power, timing offset, and frequency adjustments to the CM.                                                                                                                                                                                                                                                                                                                                                               |
| init(rc)                                                                                 | Ranging has completed.<br><br><b>Note</b> If a CM appears to be stuck in this state, it could be that the CM is able to communicate successfully on the cable network, but that the upstream is at capacity and does not have any additional bandwidth to allow the CM to finish registration and come online. Either manually move one or more CMs to other upstreams, or enable load balancing on the upstream using the <b>cable load-balance group</b> commands.                                        |
| init(d)                                                                                  | DHCP request was received, as DHCPDISCOVER. This also indicates that the first IP broadcast packet has been received from the CM.                                                                                                                                                                                                                                                                                                                                                                           |
| init(dr)                                                                                 | Cable modem has broadcast a DHCP REQUEST packet back to the DHCP server.                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| init(i)                                                                                  | Cable modem has received the DHCPOFFER reply (DHCPACK) from the DHCP server that has assigned an IP address to the modem, but the modem has not yet replied with a DHCPREQUEST message requesting that particular IP address, nor has it sent an IP packet with that IP address.<br><br><b>Note</b> If a CM appears to be stuck in this state, the CM has likely received the DHCPOFFER reply from the DHCP server, but this reply might have contained one or more invalid options for that particular CM. |
| init(io)                                                                                 | Cisco CMTS learns the DHCP offer that is sent to the cable modem from the DHCP server, which has assigned an IP address to the modem.                                                                                                                                                                                                                                                                                                                                                                       |
| init(o)                                                                                  | CM has begun to download the option file (DOCSIS configuration file) using the Trivial File Transfer Protocol (TFTP), as specified in the DHCP response. If the CM remains in this state, it indicates that the download has failed.                                                                                                                                                                                                                                                                        |
| init(t)                                                                                  | Time-of-day (ToD) exchange has started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| resetting                                                                                | CM is being reset and will shortly restart the registration process.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Registration and Provisioning Status Conditions for Devices Using IPv6 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| init6(s)                                                                                 | Cisco CMTS router learns the DHCPv6 SOLICIT message from the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| init6(a)                                                                                 | Cisco CMTS router learns the ADVERTISE message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| init6(r)                                                                                 | Cisco CMTS router learns the REQUEST response from the CM to the DHCPv6 server.                                                                                                                                                                                                                                                                                                                                                                                                                             |
| init6(i)                                                                                 | Cisco CMTS router learns the REPLY message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| init6(o)                                                                                 | Cisco CMTS router learns the REQUEST message from the CM to the TFTP server.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| init6(t)                                                                                 | Cisco CMTS router learns the REQUEST message from the CM to the ToD server.                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 94**      **MAC State Field Descriptions (continued)<sup>1</sup>**

| MAC State Value                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Non-error Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| cc(r1)                             | CM had registered and was online, but has received a Downstream Channel Change (DCC) or Upstream Channel Change (UCC) request message from the Cisco CMTS. The CM has begun moving to the new channel, and the Cisco CMTS has received the initial ranging of the CM on the new downstream or upstream channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                        |
| cc(r2)                             | This state should normally follow cc(r1) and indicates that the CM has finished its initial ranging on the new channel, and is currently performing continuous ranging on the new channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                                                                                                                             |
| offline                            | CM is considered offline (disconnected or powered down).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| online                             | CM has registered and is enabled to pass data on the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| online(d)                          | CM is registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. The CM does not forward traffic to or from the CPE devices, but the Cisco CMTS can continue to communicate with the CM using DOCSIS messages and IP traffic (such as SNMP commands).<br><br><b>Note</b> If BPI was enabled in the DOCSIS configuration file sent to the CM, assume that the CM is using BPI encryption unless other messages show that the BPI negotiation and key assignments have failed. |
| online(pk)                         | CM is registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and KEK is assigned.<br><br><b>Note</b> This state is equivalent to the online(d) and online(pk) states.                                                                                                                                                                                                                                                                        |
| online(pt)                         | CM is registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and TEK is assigned. BPI encryption is now being performed.<br><br><b>Note</b> This state is equivalent to the online(d) and online(pt) states.                                                                                                                                                                                                                                 |
| online(pk)                         | CM is registered, BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| online(pt)                         | CM is registered, BPI is enabled and TEK is assigned. BPI encryption is now being performed.<br><br><b>Note</b> If network access was disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) instead of online(pt) even when BPI encryption is enabled and operational.                                                                                                                                                                       |
| <b>Note</b>                        | If an exclamation point (!) appears in front of one of the online states, it indicates that the <b>cable dynamic-secret</b> command has been used with either the <b>mark</b> or <b>reject</b> option, and that the cable modem has failed the dynamic secret authentication check.                                                                                                                                                                                                                                                     |
| expire(pk)                         | CM is registered, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 94**      **MAC State Field Descriptions (continued)<sup>1</sup>**

| MAC State Value                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| expire(pk)                     | CM is registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.<br><br><b>Note</b> This state is equivalent to the online(d) and expire(pk) states.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| expire(pt)                     | CM is registered, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| expire(pte)                    | CM is registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.<br><br><b>Note</b> This state is equivalent to the online(d) and expire(pt) states.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Error Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| reject(m)                      | CM attempted to register but registration was refused due to a bad Message Integrity Check (MIC) value. This also could indicate that the shared secret in the DOCSIS configuration file does not match the value configured on the Cisco CMTS with the <b>cable shared-secret</b> command.<br><br>In Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases, this could also indicate that the <b>cable tftp-enforce</b> command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so.                                                                                                                                                                                                       |
| reject(c)                      | CM attempted to register, but registration was refused due to a number of possible errors: <ul style="list-style-type: none"> <li>• CM attempted to register with a minimum guaranteed upstream bandwidth that would exceed the limits imposed by the <b>cable upstream admission-control</b> command.</li> <li>• CM has been disabled because of a security violation.</li> <li>• Bad class of service (CoS) value in the DOCSIS configuration file.</li> <li>• CM attempted to create a new CoS configuration but the Cisco CMTS is configured to not permit such changes.</li> <li>• CM failed the timestamp check for its DOCSIS configuration file. (This could indicate a possible theft-of-service attempt, or a problem with the synchronization of the clocks on the CM and Cisco CMTS.)</li> </ul> |
| reject(pk)                     | KEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| reject(pke)                    | CM is registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected.<br><br><b>Note</b> This state is equivalent to the online(d) and reject(pk) states.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| reject(pt)                     | TEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| reject(pte)                    | CM is registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected.<br><br><b>Note</b> This state is equivalent to the online(d) and reject(pt) states.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



**Table 94**      **MAC State Field Descriptions (continued)<sup>1</sup>**

| MAC State Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b>     | In Cisco IOS Release 12.1(20)EC, Cisco IOS Release 12.2(15)BC1, and earlier releases, when network access is disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) even if BPI encryption fails. Use the <b>show cable modem mac-address</b> command to confirm whether BPI is enabled or disabled for a particular cable modem. |
| reject(ts)      | CM attempted to register, but registration failed because the TFTP server timestamp in the CM registration request did not match the timestamp maintained by the CMTS. This might indicate that the CM attempted to register by replaying an old DOCSIS configuration file used during a prior registration attempt.                                                                                                        |
| reject(ip)      | CM attempted to register, but registration failed because the IP address in the CM request did not match the IP address that the TFTP server recorded when it sent the DOCSIS configuration file to the CM. IP spoofing could be occurring.                                                                                                                                                                                 |
| reject(na)      | CM attempted to register, but registration failed because the CM did not send a Registration-Acknowledgement (REG-ACK) message in reply to the Registration-Response (REG-RSP) message sent by the Cisco CMTS. A Registration-NonAcknowledgement (REG-NACK) is assumed.                                                                                                                                                     |

1. The CM MAC state field can also be retrieved using SNMP by getting the value of the cdxCmtsCmStatusValue object in the CISCO-DOCS-EXT-MIB.

**Related Commands**

| Command                              | Description                                                                                          |
|--------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                     |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                        |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                                       |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                                          |
| <b>show controllers cable</b>        | Displays information about the interface controllers for a cable interface on the Cisco CMTS router. |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                        |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                |

# show cable modem connectivity

To display connectivity statistics for one or more CMs, use the **show cable modem connectivity** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] connectivity
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
connectivity
```

### Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                       |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                               |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <i>upstream port</i>         | (Optional) Displays information for all CMs using this specific upstream. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports on the cable interface line card.                                                                                                                                                                          |

|                              |                                                                                                                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                      |
| <b>name fqdn</b>             | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |

**Command Modes** Privileged EXEC (#)

| Command History | Release                  | Modification                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(4)CX and 12.2(4)BC1 | This command was introduced (and the <b>connectivity</b> option was removed from the <b>show interface cable sid</b> command).                                                                                                                                                                                                                                                               |
|                 | 12.2(33)SCA              | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |
|                 | 12.2(33)SCE              | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                           |
|                 | 12.2(33)SCF              | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                              |

**Usage Guidelines** This command displays connectivity information for all CMs, for all CMs attached to a specific CMTS cable interface, or for a particular CM, as identified by its IP address or MAC address.

#### Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Note**

The **show cable modem connectivity** command replaces the **connectivity** option for the **show interface cable sid** command, because the connectivity statistics are better managed on a per-modem basis than on a per-SID basis.

**Examples**

The following example shows sample output for the **show cable modem connectivity** command for all online CMs:

```
Router# show cable modem connectivity
```

| Prim<br>Sid | 1st time<br>online | Times<br>Online | %online | Online time |        |        | Offline time |       |       |
|-------------|--------------------|-----------------|---------|-------------|--------|--------|--------------|-------|-------|
|             |                    |                 |         | min         | avg    | max    | min          | avg   | max   |
| 1           | Apr 28 2003        | 1               | 99.67   | 00:00       | 1d1h9m | 1d1h9m | 05:38        | 04:58 | 05:38 |
| 2           | Apr 28 2003        | 1               | 99.66   | 00:00       | 1d1h8m | 1d1h8m | 05:46        | 05:02 | 05:46 |
| 3           | Apr 28 2003        | 1               | 99.69   | 00:00       | 1d1h7m | 1d1h7m | 05:18        | 04:34 | 05:18 |

The following example shows sample output for the **show cable modem connectivity** command for all online CMs for a particular cable interface:

```
Router# show cable modem c8/1/0 connectivity
```

| Prim<br>Sid | 1st time<br>online | Times<br>Online | %online | Online time |         |         | Offline time |       |       |
|-------------|--------------------|-----------------|---------|-------------|---------|---------|--------------|-------|-------|
|             |                    |                 |         | min         | avg     | max     | min          | avg   | max   |
| 1           | Apr 28 2003        | 1               | 99.67   | 00:00       | 1d1h12m | 1d1h12m | 05:38        | 04:58 | 05:38 |
| 2           | Apr 28 2003        | 1               | 99.66   | 00:00       | 1d1h11m | 1d1h11m | 05:46        | 05:02 | 05:46 |
| 3           | Apr 28 2003        | 1               | 99.69   | 00:00       | 1d1h11m | 1d1h11m | 05:18        | 04:34 | 05:18 |

The following example shows sample output for the **show cable modem connectivity** command for a particular CM:

```
Router# show cable modem 0010.7bb3.fcd1 connectivity
```

| Prim<br>Sid | 1st time<br>online | Times<br>Online | %online | Online time |        |         | Offline time |       |       |
|-------------|--------------------|-----------------|---------|-------------|--------|---------|--------------|-------|-------|
|             |                    |                 |         | min         | avg    | max     | min          | avg   | max   |
| 1           | May 30 2000        | 4               | 99.85   | 48:20       | 11h34m | 1d2h23m | 00:01        | 00:59 | 03:00 |

Table 95 describes the information shown in the **show cable modem connectivity** displays:

**Table 95** Descriptions for the show cable modem connectivity Fields

| Field           | Description                                                    |
|-----------------|----------------------------------------------------------------|
| Prim SID        | The primary SID assigned to this CM.                           |
| 1st time online | First time at which the modem with this SID connected.         |
| Times online    | Number of times the modem with this SID connected.             |
| % online        | Percentage of time the modem with this SID has been connected. |

**Table 95** Descriptions for the show cable modem connectivity Fields (continued)

| Field        | Description                                                                                                                                                                                                                                                             |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Online time  | The minimum, average, and maximum number of days, hours, and minutes the modem with this SID has been connected.<br><br><b>Note</b> A CM is considered online when it has completed the registration process and has communicated with the DHCP, TFTP, and TOD servers. |
| Offline time | The minimum, average, and maximum number of days, hours, and minutes the modem with this SID has been disconnected.<br><br><b>Note</b> A CM is considered offline after it has missed 16 consecutive station maintenance messages.                                      |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                              | Description                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                  |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                     |
| <b>show cable modem calls</b>        | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                |
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more cable modems.                                                       |
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems.                                  |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                                                       |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                              |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                                                    |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                                     |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                             |

# show cable modem counters

To display downstream and upstream traffic counters for one or more cable modems (CMs), use the **show cable modem counters** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] counters
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
counters
```

### Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                       |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                               |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

|                              |                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream port</b>         | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <b>logical-channel-index</b> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                  |
| <b>name fqdn</b>             | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |
| <b>counters</b>              | Displays downstream and upstream traffic counters for one or more cable modems.                                                                                                                                                                                                                                                 |

**Defaults**

Displays counter information for all CMs.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release                  | Modification                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX and 12.2(4)BC1 | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                 |
| 12.2(33)SCA              | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |
| 12.2(33)SCE              | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                           |
| 12.2(33)SCF              | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                              |

**Usage Guidelines****Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration**

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.



#### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.



#### Note

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

## Examples

The following example shows sample output for the **show cable modems counters** command for all CMs:

```
Router# show cable modem counters
```

| MAC Address    | US Packets | US Bytes | DS Packets | DS Bytes |
|----------------|------------|----------|------------|----------|
| 0050.7366.1243 | 29         | 2126     | 29         | 2126     |
| 0002.b970.0027 | 1811       | 116174   | 29         | 2126     |
| 0006.5314.858d | 329154     | 21071059 | 134607     | 9961268  |

```
Router#
```

The following example shows sample output for the **show cable modems counters** command for all CMs on a particular cable interface:

```
Router# show cable modem c8/1/0 counters
```

| MAC Address    | US Packets | US Bytes | DS Packets | DS Bytes |
|----------------|------------|----------|------------|----------|
| 0050.7366.1243 | 29         | 2126     | 29         | 2126     |
| 0002.b970.0027 | 1811       | 116174   | 29         | 2126     |
| 0006.5314.858d | 329154     | 21071059 | 134607     | 9961268  |

```
Router#
```

The following example shows sample output for the **show cable modems counters** command for a particular CM, as identified by its MAC address:

```
Router# show cable modem 0010.7bb3.fcd1 counters
```

| MAC Address    | US Packets | US Bytes  | DS Packets | DS Bytes  |
|----------------|------------|-----------|------------|-----------|
| 0010.7bb3.fcd1 | 1452082    | 171344434 | 1452073    | 171343858 |

```
Router#
```

The following example shows sample output for the **show cable modems counters** command for a particular CM, as identified by its IP address:

```
Router# show cable modem 23.1.1.10 counters
```



```

MAC Address US Packets US Bytes DS Packets DS Bytes
0002.b970.0027 1811 116174 29 2126

```

```
Router#
```

Table 96 describes the fields shown in the **show cable modem counters** displays:

**Table 96** Descriptions for the **show cable modem counters** Fields

| Field       | Description                                                |
|-------------|------------------------------------------------------------|
| MAC Address | MAC address for the CM.                                    |
| US Packets  | Number of packets this CM has transmitted on the upstream. |
| US Bytes    | Number of bytes this CM has transmitted on the upstream.   |
| DS Packets  | Number of packets this CM has received on the downstream.  |
| DS Bytes    | Number of byte this CM has received on the downstream.     |

#### Related Commands

| Command                              | Description                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                     |
| <b>show cable modem access-group</b> | Displays the access groups for the CMs on a particular cable interface.                                           |
| <b>show cable modem calls</b>        | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem classifiers</b>  | Displays information about the classifiers for a particular CM.                                                   |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                                             |
| <b>show cable modem cpe</b>          | Displays the CPE devices accessing the cable interface through a particular CM.                                   |
| <b>show cable modem qos</b>          | Displays quality of service (QoS) and service flow information for a particular CM.                               |
| <b>show cable modem registered</b>   | Displays a list of the CMs that are marked as registered with the Cisco CMTS.                                     |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                                                       |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                              |
| <b>show cable modem unregistered</b> | Displays a list of the CMs that are marked as unregistered with the Cisco CMTS.                                   |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                                     |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                             |

# show cable modem cpe

To display the customer premise equipment (CPE) devices accessing the cable interface through a particular cable modem (CM), use the **show cable modem cpe** command in privileged EXEC mode.

```
show cable modem {ip-address | mac-address | name fqdn} cpe
```

## Syntax Description

|                    |                                                                                                                                                                                                                                                                     |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>  | Displays the CPE devices for the CM with the specified IPv4 or IPv6 address.                                                                                                                                                                                        |
| <i>mac-address</i> | Displays the CPE devices for the CM with the specified MAC address.                                                                                                                                                                                                 |
| <b>name fqdn</b>   | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release                  | Modification                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3XA                   | This command was introduced.                                                                                                                                                                                                                                                                                                                                                          |
| 12.1(4)CX and 12.2(4)BC1 | The command was simplified to display only the IP and MAC addresses for the CPE devices.                                                                                                                                                                                                                                                                                              |
| 12.2(33)SCA              | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |

## Usage Guidelines

This command lists the CPE devices that are accessing the cable network through a particular CM. You can identify the CM either by its IP address or by its MAC address.



### Note

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

### Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the

**ping** *ip-address* command, and then the **show cable modem** *ip-address* command will show the cable modem. You can also display any particular cable modem by using the **show cable modem** **| include** *ip-address* command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.



#### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

#### Examples

The following example shows sample output for the **show cable modem cpe** command, listing the CPE devices by their MAC and IP addresses:

```
Router# show cable modem 0019.474a.c14a cpe
IP address MAC address Dual IP
50.3.37.3 0005.0052.2c1d Y
```

Table 106 describes the significant fields shown in the display.

**Table 97** *show cable modem cpe Field Descriptions*

| Field       | Description                                                                                          |
|-------------|------------------------------------------------------------------------------------------------------|
| IP Address  | IP address acquired by the CPE.                                                                      |
| MAC Address | MAC address of the CPE.                                                                              |
| Dual IP     | Dual IP flag. Identifies whether or not (“Y” or “N”) the CPE supports both IPv4 and IPv6 addressing. |

#### Related Commands

| Command                              | Description                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                  |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                     |
| <b>show cable modem calls</b>        | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem classifiers</b>  | Displays information about the classifiers for a particular CM.                                                   |
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                                             |
| <b>show cable modem errors</b>       | Displays error statistics for one or more CMs.                                                                    |

| Command                              | Description                                                                      |
|--------------------------------------|----------------------------------------------------------------------------------|
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more cable modems.                      |
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems. |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                      |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                   |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.    |
| <b>show interface cable sid</b>      | Displays cable interface information.                                            |

# show cable modem docsis device-class

To display the DOCSIS device-class information for cable modems (CMs) on all or specified cable interfaces and upstreams, use the **show cable modem docsis device-class** command in privileged EXEC configuration mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem docsis device-class [summary [cable slot/subslot [cable slot/subslot
[upstream port1 port2]]] [total]
```

```
show cable modem cable slot/subslot docsis version summary
```

## Cisco uBR10012 Router

```
show cable modem docsis device-class [summary [cable slot/subslot/port [cable
slot/subslot/port] [upstream port1 port2]]] [total]
```

```
show cable modem cable slot/subslot/port docsis version summary
```

### Syntax Description

|                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>summary</b>                                                     | (Optional) Displays a summary of DOCSIS device class information for CMs on all or specified cable interfaces on the CMTS router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>cable slot/subslot</b><br><b>[cable slot/subslot]</b>           | <p>(Optional) Specifies a single cable interface, or a range of cable interfaces on a Cisco uBR7100 or Cisco uBR7200 series router, whose CMs you want to display information about, where:</p> <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card.</li> <li><i>subslot</i>—Specifies the downstream port number.</li> </ul> <p>Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering.</p> |
| <b>cable slot/subslot/port</b><br><b>[cable slot/subslot/port]</b> | <p>(Optional) Specifies a single cable interface, or a range of cable interfaces on a Cisco uBR10012 router, whose CMs you want to display information about, where:</p> <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul>                                                |

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream</b> <i>port1 port2</i> | (Optional) Specifies a specific upstream port, or a range of upstream ports on the specified cable interface(s), whose CMs you want to display information about, where: <ul style="list-style-type: none"> <li><i>port1</i>—Specify only <i>port1</i> if you want to display information about a single upstream. When used with the <i>port2</i> argument, specifies the beginning of a range of upstream ports, and <i>port1</i> must be a lower-numbered port than <i>port2</i>.</li> <li><i>port2</i>—Specifies the end of a range of upstream ports, and <i>port2</i> must be a higher-numbered port than <i>port1</i>.</li> </ul> |
| <b>total</b>                       | (Optional) Displays a total of DOCSIS device-class information for the CMs connected to all interfaces, or to the specified cable interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Command Default**

The default form of the command (**show cable modem docsis device-class** without any options) provides DOCSIS device class information for all CMs on the CMTS router.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced.                                                                                       |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines**

This command displays a summary of DOCSIS device-class information for all CMs for a single cable interface, or for a range of cable interfaces, and optionally specified upstreams on those cable interfaces.

**Examples**

The following example shows typical output for the default form of the **show cable modem docsis device-class** command on a Cisco uBR100012 router:

```
Router# show cable modem docsis device-class
MAC Address I/F MAC State Prim Reg Device Class Reg
 Sid Ver ----- Priv
0030.80bc.22b9 C3/0/U0 online(pt) 1 1.0 CM BPI
0000.cadb.04b2 C3/0/U0 online(pt) 2 1.1 eCM eMTA BPI+
0000.cadb.0512 C3/0/U0 online(pt) 3 1.1 eCM eMTA eSTB BPI+
0003.e38f.f5c7 C3/0/U1 online(pt) 4 1.0 CM BPI
0000.cadb.0bae C3/0/U1 online(pt) 5 1.1 eCM ePS BPI+
0010.7b6b.77ed C3/0/U2 online 6 1.0 CM BPI+
0000.cadb.0356 C4/0/U0 online(pt) 1 1.1 eCM eMTA BPI+
0000.cadb.02a6 C4/0/U0 init(d) 2 n/a <unavailable> BPI+
0000.cadb.2f7a C4/0/U1 online(pt) 3 2.0 eCM eSTB BPI+
0000.cadb.2952 C4/0/U2 online(pt) 4 1.1 eCM eSTB ePS BPI+
0000.cadb.0236 C4/0/U2 init(d) 6 n/a <unavailable> BPI+
0003.e3a6.850d C4/0/U3 online(pt) 7 1.1 eCM eMTA ePS BPI+
0003.e3a6.85ad C4/0/U3 online(pt) 8 1.0 CM BPI
```

The following example shows sample output for the **show cable modem docsis device-class** command for a particular cable interface, in chassis slot 3 and subslot 0:

```
Router# show cable modem cable3/0 docsis device-class
MAC Address I/F MAC Prim Reg Device Class Reg
 State Sid Ver ----- Priv
0030.80bc.22b9 C3/0/U0 online(pt) 1 1.0 CM BPI
0000.cadb.04b2 C3/0/U0 online(pt) 2 1.1 eCM eMTA BPI+
0000.cadb.0512 C3/0/U0 online(pt) 3 1.1 eCM eMTA eSTB BPI+
0003.e38f.f5c7 C3/0/U1 online(pt) 4 1.0 CM BPI
0000.cadb.0bae C3/0/U1 online(pt) 5 1.1 eCM ePS BPI+
0010.7b6b.77ed C3/0/U2 online 6 1.0 CM
```

**Table 98** *show cable modem docsis device-class Field Descriptions*

| Field        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address  | The MAC address of the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| I/F          | The cable interface line card providing the upstream for this CM.                                                                                                                                                                                                                                                                                                                                                                                          |
| MAC State    | The current state of the MAC layer.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Prim Sid     | The primary SID assigned to this CM.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Reg Ver      | Displays the maximum supported version of DOCSIS that the CM supports. The possible values are: DOCSIS 1.0, DOCSIS 1.1, DOCSIS 2.0, and DOCSIS 3.0. Shows “n/a” if the modem is not online.                                                                                                                                                                                                                                                                |
| Device Class | Displays the device-class information for the PacketCable device. The modem can report its device-class type during registration. The possible values are: <ul style="list-style-type: none"> <li>CM or eCM—A standalone cable modem or embedded CM.</li> <li>ePS—Embedded Portal Services</li> <li>eMTA—Embedded Multimedia Terminal Adapter</li> <li>eSTB—Embedded Set Top Box</li> <li>unavailable—The CM has not reported its device class.</li> </ul> |
| Reg Priv     | Indicates whether Baseline Privacy Interface (BPI) or BPI Plus (BPI+) encryption is enabled for the CM.                                                                                                                                                                                                                                                                                                                                                    |

### Examples for Summary and Total Options

The following example shows the corresponding display for the **show cable modem docsis device-class total** command:

```
Router# show cable modem docsis device-class total
 Online unrep CM eCM eMTA eSTB ePS
Total: 13 2 4 7 4 3 3
```

The following example shows sample output for the **show cable modem docsis device-class summary** form of the command on a Cisco CMTS router:

```
Router# show cable modem docsis device-class summary
 DOCSIS Device Class

Interface Online unrep CM eCM eMTA eSTB ePS
Cable3/0/U0 3 0 1 2 2 1 0
Cable3/0/U1 2 0 1 1 0 0 1
Cable3/0/U2 1 0 1 0 0 0 0
Cable4/0/U0 2 1 0 1 1 0 0
Cable4/0/U1 1 0 0 1 0 1 0
```

# show cable modem docsis device-class

```

Cable4/0/U2 2 1 0 1 0 1 1
Cable4/0/U3 2 0 1 1 1 0 1

```

The following example shows sample output for the **show cable modem docsis device-class summary** command with the **total** option on a Cisco CMTS router:

```

Router# show cable modem docsis device-class summary total
 DOCSIS Device Class

Interface Online unrep CM eCM eMTA eSTB ePS
Cable3/0/U0 3 0 1 2 2 1 0
Cable3/0/U1 2 0 1 1 0 0 1
Cable3/0/U2 1 0 1 0 0 0 0
Cable4/0/U0 2 1 0 1 1 0 0
Cable4/0/U1 1 0 0 1 0 1 0
Cable4/0/U2 2 1 0 1 0 1 1
Cable4/0/U3 2 0 1 1 1 0 1

Total: 13 2 4 7 4 3 3

```

The following example shows sample output for the **show cable modem docsis device-class summary total** command for all enabled upstreams on a specific cable interface line card on a Cisco CMTS router:

```

Router# show cable modem docsis device-class summary cable 3/0 total
 DOCSIS Device Class

Interface Online unrep CM eCM eMTA eSTB ePS
Cable3/0/U0 3 0 1 2 2 1 0
Cable3/0/U1 2 0 1 1 0 0 1
Cable3/0/U2 1 0 1 0 0 0 0

Total: 6 0 3 3 2 1 1

```

The following example shows sample output for the **show cable modem docsis device-class summary total** command for a range of interfaces on a Cisco CMTS router:

```

Router# show cable modem docsis device-class summary cable 3/0 cable 4/0 total
 DOCSIS Device Class

Interface Online unrep CM eCM eMTA eSTB ePS
Cable3/0/U0 3 0 1 2 2 1 0
Cable3/0/U1 2 0 1 1 0 0 1
Cable3/0/U2 1 0 1 0 0 0 0
Cable4/0/U0 2 1 0 1 1 0 0
Cable4/0/U1 1 0 0 1 0 1 0
Cable4/0/U2 2 1 0 1 0 1 1
Cable4/0/U3 2 0 1 1 1 0 1

Total: 13 2 4 7 4 3 3

```

The following example shows sample output for the **show cable modem docsis device-class summary total** command for a range of interfaces and upstreams on a CMTS router:

```

Router# show cable modem docsis device-class summary cable 3/0 cable 4/0 upstream 0 2
total
 DOCSIS Device Class

Interface Online unrep CM eCM eMTA eSTB ePS
Cable3/0/U0 3 0 1 2 2 1 0
Cable3/0/U1 2 0 1 1 0 0 1
Cable3/0/U2 1 0 1 0 0 0 0
Cable4/0/U0 2 1 0 1 1 0 0
Cable4/0/U1 1 0 0 1 0 1 0

```



```

Cable4/0/U2 2 1 0 1 0 1 1
Total: 11 2 3 6 3 3 2

```

The following example shows sample output for the **show cable modem docsis device-class summary total** command for a range of upstreams on an interface:

```

Router# show cable modem docsis device-class summary cable3/0 upstream 0 1 total
 DOCSIS Device Class

```

```

Interface Online unrep CM eCM eMTA eSTB ePS
Cable3/0/U0 3 0 1 2 2 1 0
Cable3/0/U1 2 0 1 1 0 0 1
Total: 5 0 2 3 2 1 1

```

The following example shows sample output for the **show cable modem docsis device-class summary** command for all enabled upstreams on a specific cable interface line card:

```

Router# show cable modem cable3/0 docsis device-class summary
 DOCSIS Device Class

```

```

Interface Online unrep CM eCM eMTA eSTB ePS
Cable3/0/U0 3 0 1 2 2 1 0
Cable3/0/U1 2 0 1 1 0 0 1
Cable3/0/U2 1 0 1 0 0 0 0
Total: 6 0 3 3 2 1 1

```

**Table 99** *show cable modem docsis device-class summary Field Descriptions*

| Field     | Description                                                                                                                           |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------|
| Interface | Name of the cable interface and associated upstreams on the Cisco CMTS router.                                                        |
| Online    | Total number of CMs currently online on this cable interface.                                                                         |
| unrep     | Total number of CMs on this interface for which the device-class information is unreported or unavailable.                            |
| CM        | Total number of CMs on this interface that have a reported device class as a standalone cable modem.                                  |
| eCM       | Total number of CMs on this interface that have reported the device class as an embedded cable modem.                                 |
| eMTA      | Total number of CMs on this interface that have reported the device class as an embedded multimedia terminal adapter.                 |
| eSTB      | Total number of CMs on this interface that have reported the device class as an embedded set-top box.                                 |
| ePS       | Total number of CMs on this interface that have reported the device class as embedded portal services.                                |
| Total     | The total number of all CMs reported online and for a given DOCSIS device class across all cable interfaces on the Cisco CMTS router. |

 show cable modem docsis device-class

| Related Commands | Command                         | Description                                                                                    |
|------------------|---------------------------------|------------------------------------------------------------------------------------------------|
|                  | show cable modem docsis version | Displays the DOCSIS version information for CMs on one or more cable interfaces and upstreams. |

# show cable modem docsis version

To display the DOCSIS version information for cable modems (CMs) on one or more cable interfaces and upstreams, use the **show cable modem docsis version** command in privileged EXEC configuration mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem docsis version [summary [cable {slot/port | slot/cable-interface-index} [cable
{slot/port | slot/cable-interface-index}] [upstream port1 port2 [logical-channel-index]]]
[total]
```

```
show cable modem cable {slot/port | slot/cable-interface-index} docsis version summary
```

## Cisco uBR10012 Router

```
show cable modem docsis version [summary [cable {slot/subslot/port |
slot/subslot/cable-interface-index} [cable {slot/subslot/port |
slot/subslot/cable-interface-index}] [upstream port1 port2 [logical-channel-index]]] [total]
```

```
show cable modem cable {slot/subslot/port | slot/subslot/cable-interface-index} docsis version
summary
```

| Syntax Description           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>summary</b>               |  | (Optional) Displays a summary of DOCSIS device class information for CMs on all or specified cable interfaces on the CMTS router.                                                                                                                                                                                                                                                                                                                                                             |
| <i>slot</i>                  |  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               |  | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  |  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> |  | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream</b> <i>port1 port2</i> | (Optional) Specifies a specific upstream port, or a range of upstream ports on the specified cable interface(s), whose cable modems you want to display information about, where: <ul style="list-style-type: none"> <li><i>port1</i>—Specify only <i>port1</i> if you want to display information about a single upstream. When used with the <i>port2</i> argument, specifies the beginning of a range of upstream ports, and <i>port1</i> must be a lower-numbered port than <i>port2</i>.</li> <li><i>port2</i>—Specifies the end of a range of upstream ports, and <i>port2</i> must be a higher-numbered port than <i>port1</i>.</li> </ul> |
| <i>logical-channel-index</i>       | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>total</b>                       | (Optional) Displays a total of DOCSIS device-class information for the CMs connected to all interfaces, or to the specified cable interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>docsis version summary</b>      | Displays the DOCSIS version information for cable modems on one or more cable interfaces and upstreams.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Command Default**

The default form of the command (**show cable modem docsis version** without any options) provides DOCSIS version information for all CMs on the CMTS router.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release      | Modification                                                                                                                                     |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC   | This command was introduced.                                                                                                                     |
| 12.2(33)SCB  | This command was integrated into Cisco IOS Release 12.2(33)SCB.                                                                                  |
| 12.3(23)BC7  | The output for the <b>show cable modem docsis version summary total</b> forms of the command were modified.                                      |
| 12.2(33)SCD2 | This command was modified. The command output was modified to display the cable modems that are in upstream and downstream partial service mode. |
| 12.2(33)SCE  | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                               |
| 12.2(33)SCF  | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                  |

**Usage Guidelines**

This command displays a summary of DOCSIS version information for all CMs for a single cable interface or upstream, or for a range of cable interfaces or upstreams.

**Examples****Examples: show cable modem docsis version Command**

The following example shows typical output for the default form of the **show cable modem docsis version** command on a Cisco uBR10012 router:

```
Router# show cable modem docsis version
```

```
MAC Address I/F MAC Prim Reg QoS US Phy DS Ch1
 State Sid Ver Prov Mode Mode
```

```

0018.6852.800a C5/1/0/U3 w-online(pt) 166 2.0 1.1 tdma WB
0018.6852.7f92 C5/1/0/U1 w-online(pt) 167 2.0 1.1 tdma WB
0014.bfbe.3ea6 C5/1/0/U0 w-online(pt) 168 2.0 1.1 tdma WB
0018.6852.8022 C5/1/0/U2 w-online(pt) 169 2.0 1.1 tdma WB
0018.6852.7fa0 C5/1/0/U0 w-online(pt) 170 2.0 1.1 tdma WB
0018.6852.8016 C5/1/0/U3 w-online(pt) 171 2.0 1.1 tdma WB
0018.6852.8008 C5/1/0/U2 w-online(pt) 172 2.0 1.1 tdma WB
0018.6852.800e C5/1/0/U1 w-online(pt) 173 2.0 1.1 tdma WB
0018.6852.8000 C5/1/0/U1 w-online(pt) 174 2.0 1.1 tdma WB
0002.8a8c.ed06 C5/1/1/U0 online(pt) 79 2.0 1.1 tdma NB
0018.6852.801c C5/1/1/U0 w-online(pt) 80 2.0 1.1 tdma WB
0018.6852.8006 C5/1/1/U0 w-online(pt) 81 2.0 1.1 tdma WB
00e0.6f2c.6a4e C5/1/1/U0 online(pt) 82 1.1 1.1 tdma NB
0011.ae02.a63c C5/1/3/U0 online(pt) 37 2.0 1.1 tdma NB
0011.ae00.c514 C5/1/3/U0 online(pt) 38 2.0 1.1 tdma NB

```

The following example shows sample output for the **show cable modem docsis version** command for a particular cable interface on a Cisco uBR10012 router:

```
Router# show cable modem cable 5/1/0 docsis version
```

```

MAC Address I/F MAC Prim Reg QoS US Phy DS Chl
 State Sid Ver Prov Mode Mode
0018.6852.800a C5/1/0/U3 w-online(pt) 166 2.0 1.1 tdma WB
0018.6852.7f92 C5/1/0/U1 w-online(pt) 167 2.0 1.1 tdma WB
0014.bfbe.3ea6 C5/1/0/U0 w-online(pt) 168 2.0 1.1 tdma WB
0018.6852.8022 C5/1/0/U2 w-online(pt) 169 2.0 1.1 tdma WB
0018.6852.7fa0 C5/1/0/U0 w-online(pt) 170 2.0 1.1 tdma WB
0018.6852.8016 C5/1/0/U3 w-online(pt) 171 2.0 1.1 tdma WB
0018.6852.8008 C5/1/0/U2 w-online(pt) 172 2.0 1.1 tdma WB
0018.6852.800e C5/1/0/U1 w-online(pt) 173 2.0 1.1 tdma WB
0018.6852.8000 C5/1/0/U1 w-online(pt) 174 2.0 1.1 tdma WB

```

Table 1 describes the significant fields shown in the display.

**Table 100** *show cable modem docsis version Field Descriptions*

| Field       | Description                                                                                                                                                          |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address | The MAC address of the CM.                                                                                                                                           |
| I/F         | The cable interface line card providing the upstream for this CM.                                                                                                    |
| MAC State   | The current state of the MAC layer.                                                                                                                                  |
| Prim Sid    | The primary SID assigned to this CM.                                                                                                                                 |
| Reg Ver     | Displays the maximum supported version of DOCSIS that the CM supports. The possible values are: 1.0, 1.1, 2.0, and 3.0. Shows “n/a” if the modem is not online.      |
| QoS Prov    | Displays the version of DOCSIS that the CM currently is provisioned and registered for. The possible values are: 1.0 or 1.1. Shows “n/a” if the modem is not online. |

**Table 100** *show cable modem docsis version Field Descriptions*

| Field       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| US Phy Mode | <p>Displays the DOCSIS operating mode for the CM, with the following possible values:</p> <ul style="list-style-type: none"> <li>• tdma—DOCSIS 1.X, Time Division Multiple Access (TDMA)-only mode</li> <li>• atdma—DOCSIS 2.0 Advanced Time Division Multiple Access (A-TDMA) mode</li> <li>• scdma—DOCSIS 2.0 Synchronous Code Division Multiple Access (SCDMA) mode</li> </ul> <p><b>Note</b> This field is the same as that returned by the docsIfCmtsCmStatusModulationType object in the DOCS-IF-MIB.</p> |
| DS Chl Mode | <p>Displays the downstream channel mode for the CM, with the following possible values:</p> <ul style="list-style-type: none"> <li>• NB—Narrowband</li> <li>• WB—Wideband</li> </ul>                                                                                                                                                                                                                                                                                                                            |

**Examples: show cable modem version docsis version total Command**

The following example shows the corresponding display for the **show cable modem docsis version total** command:

```
Router# show cable modem docsis version total

Total Registered CMs: 15
Total Unregistered CMs: 0

Total DOCSIS 3.0 Operating/Capable/Registered CMs: 0/0/0
Total DOCSIS 2.0 Operating/Capable/Registered CMs: 0/14/14
Total DOCSIS 1.1 Operating/Capable/Registered CMs: 15/15/1
Total DOCSIS 1.0 Operating/Capable/Registered CMs: 0/15/0

Total v1.1 US QoS operating CMs: 15
Total V1.0 US QoS operating CMs: 0

Total Wide Band US operating CMs: 0
Total scdma US Phy operating CMs: 0
Total atdma US Phy operating CMs: 0
Total tdma US Phy operating CMs: 15

Total Wide Band DS operating CMs: 11
Total Narrow Band DS operating CMs: 4
```

Beginning in Cisco IOS Release 12.2(33)SCD2, the output of the **show cable modem docsis version total** command was modified to display the cable modems that are in partial service mode as shown in the following example:

```
Router# show cable modem docsis version total

Total Registered CMs: 35
Total Unregistered CMs: 1

Total DOCSIS 3.0 Operating/Capable/Registered CMs: 21/22/22
Total DOCSIS 2.0 Operating/Capable/Registered CMs: 0/34/12
Total DOCSIS 1.1 Operating/Capable/Registered CMs: 35/35/1
Total DOCSIS 1.0 Operating/Capable/Registered CMs: 0/35/0
```

```

Total v1.1 US QoS operating CMs: 35
Total V1.0 US QoS operating CMs: 0

Total Wide Band US operating CMs: 21
Total Wide Band US partial-mode CMs: 9
Total scdma US Phy operating CMs: 0
Total atdma US Phy operating CMs: 0
Total tdma US Phy operating CMs: 14

Total Wide Band DS operating CMs: 22
Total Wide Band DS partial-mode CMs: 12
Total Narrow Band DS operating CMs: 13

```

Table 2 describes the fields shown in the **show cable modem docsis version total** command display.

**Table 101** *show cable modem docsis version total Field Descriptions*

| Field                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total Registered CMs                                           | Total number of cable modems currently online in a CMTS router.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Total Unregistered CMs                                         | Total number of cable modems that are either offline and not currently communicating with the CMTS router, or that are attempting to come online but are not yet registered.                                                                                                                                                                                                                                                                                                                                     |
| Total DOCSIS x.y<br>Operating/Capable/Registered<br>CMs: a/b/c | Total number of cable modems (in a/b/c format) for the specified DOCSIS version (x.y) that have the following status: <ul style="list-style-type: none"> <li>Operating—Total number (a) of CMs currently operating in the specified DOCSIS version.</li> <li>Capable—Total number (b) of CMs that can operate in the specified DOCSIS version, but might not be operating in that version.</li> <li>Registered—Total number (c) of CMs that are currently registered in the specified DOCSIS version.</li> </ul> |
| Total Vx.y US QoS operating<br>CMs                             | Total number of cable modems whose upstreams are currently operating in a specified DOCSIS version (x.y) quality of service (QoS).                                                                                                                                                                                                                                                                                                                                                                               |
| Total Wide Band US operating<br>CMs                            | Total number of cable modems with upstreams currently operating in wideband channel mode.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Total Wide Band US<br>partial-mode CMs                         | Total number of cable modems with upstreams currently operating in partial wideband channel mode.                                                                                                                                                                                                                                                                                                                                                                                                                |
| Total <i>mode</i> US Phy operating<br>CMs                      | Total number of cable modems with upstreams currently operating in a particular wideband channel mode, where <i>mode</i> is: <ul style="list-style-type: none"> <li>scdma—DOCSIS 2.0 Synchronous Code Division Multiple Access (SCDMA) mode</li> <li>atdma—DOCSIS 2.0 Advanced Time Division Multiple Access (A-TDMA) mode</li> <li>tdma—DOCSIS 1.X, Time Division Multiple Access (TDMA) mode</li> </ul>                                                                                                        |
| Total Wide Band DS operating<br>CMs                            | Total number of cable modems with downstreams operating in wideband channel mode.                                                                                                                                                                                                                                                                                                                                                                                                                                |

**Table 101** *show cable modem docsis version total Field Descriptions*

| Field                               | Description                                                                               |
|-------------------------------------|-------------------------------------------------------------------------------------------|
| Total Wide Band DS partial-mode CMs | Total number of cable modems with downstreams operating in partial wideband channel mode. |
| Total Narrow Band DS operating CMs  | Total number of cable modems with downstreams operating in narrowband channel mode.       |

**Examples: show cable modem docsis version summary Command**

The following example shows typical output for the default form of the **show cable modem docsis version summary** command on a Cisco uBR10012 router:

```
Router# show cable modem docsis version summary
```

## Cable Modem DOCSIS Version Summary

| Interface | Online | DOCSIS Registered |      |      |      | US QoS |      | US Phy Mode |      |      |      | DS Mode |    |
|-----------|--------|-------------------|------|------|------|--------|------|-------------|------|------|------|---------|----|
|           |        | v3.0              | v2.0 | v1.1 | v1.0 | v1.1   | v1.0 | WB          | scdm | atdm | tdma | WB      | NB |
| C5/1/0/U0 | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U1 | 3      | 0                 | 3    | 0    | 0    | 3      | 0    | 0           | 0    | 0    | 3    | 3       | 0  |
| C5/1/0/U2 | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U3 | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/1/U0 | 4      | 0                 | 3    | 1    | 0    | 4      | 0    | 0           | 0    | 0    | 4    | 2       | 2  |
| C5/1/3/U0 | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 0       | 2  |

Beginning in Cisco IOS Release 12.2(33)SCD2, the output of the **show cable modem docsis version summary** command was modified to display the cable modems that are in full or partial service mode as shown in the following example:

```
Router# show cable modem docsis version summary
```

## Cable Modem DOCSIS Version Summary

| Interface | Online | DOCSIS Registered |      |      |      | US QoS |      | US Phy Mode |      |      |    | DOCSIS Mode |    |    |  |
|-----------|--------|-------------------|------|------|------|--------|------|-------------|------|------|----|-------------|----|----|--|
|           |        | v3.0              | v2.0 | v1.1 | v1.0 | v1.1   | v1.0 | scdm        | atdm | tdma | UP | WB          | WP | NB |  |
| C7/0/0/UB | 12     | 12                | 0    | 0    | 0    | 12     | 0    | 0           | 0    | 0    | 9  | 12          | 12 | 0  |  |
| C7/0/0/U0 | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 2    | 0  | 0           | 0  | 2  |  |
| C7/0/0/U1 | 1      | 0                 | 1    | 0    | 0    | 1      | 0    | 0           | 0    | 1    | 0  | 0           | 0  | 1  |  |
| C7/0/0/U3 | 4      | 0                 | 4    | 0    | 0    | 4      | 0    | 0           | 0    | 4    | 0  | 0           | 0  | 4  |  |
| C8/0/0/UB | 9      | 9                 | 0    | 0    | 0    | 9      | 0    | 0           | 0    | 0    | 0  | 9           | 0  | 0  |  |
| C8/0/0/U0 | 1      | 1                 | 0    | 0    | 0    | 1      | 0    | 0           | 0    | 1    | 0  | 1           | 0  | 0  |  |
| C8/0/0/U1 | 5      | 0                 | 4    | 1    | 0    | 5      | 0    | 0           | 0    | 5    | 0  | 0           | 0  | 5  |  |
| C8/0/0/U3 | 1      | 0                 | 1    | 0    | 0    | 1      | 0    | 0           | 0    | 1    | 0  | 0           | 0  | 1  |  |

The following example shows typical output for the **show cable modem docsis version summary** command with the **total** option on a Cisco uBR10012 router:

```
Router# show cable modem docsis version summary total
```

## Cable Modem DOCSIS Version Summary

| Interface | Online | DOCSIS Registered |      |      |      | US QoS |      | US Phy Mode |      |      |      | DS Mode |    |
|-----------|--------|-------------------|------|------|------|--------|------|-------------|------|------|------|---------|----|
|           |        | v3.0              | v2.0 | v1.1 | v1.0 | v1.1   | v1.0 | WB          | scdm | atdm | tdma | WB      | NB |
| C5/1/0/U0 | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U1 | 3      | 0                 | 3    | 0    | 0    | 3      | 0    | 0           | 0    | 0    | 3    | 3       | 0  |



```

C5/1/0/U2 2 0 2 0 0 2 0 0 0 0 2 2 0
C5/1/0/U3 2 0 2 0 0 2 0 0 0 0 2 2 0
C5/1/1/U0 4 0 3 1 0 4 0 0 0 0 4 2 2
C5/1/3/U0 2 0 2 0 0 2 0 0 0 0 2 0 2

Total: 15 0 14 1 0 15 0 0 0 0 15 11 4

```

Beginning in Cisco IOS Release 12.3(23)BC7, the output for the **show cable modem docsis version summary total** command was modified as shown in the following example:

```
Router# show cable modem docsis version summary total
```

```

 Cable Modem DOCSIS Version Summary

```

| Interface | Online | DOCSIS Registered |      |      |      | US QoS   |      | US Phy Mode |      |      |      | DS Mode |    |
|-----------|--------|-------------------|------|------|------|----------|------|-------------|------|------|------|---------|----|
|           |        | v3.0              | v2.0 | v1.1 | v1.0 | v1.1     | v1.0 | WB          | scdm | atdm | tdma | WB      | NB |
| C5/1/0/U0 | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U1 | 3      | 0                 | 3    | 0    | 0    | 3        | 0    | 0           | 0    | 0    | 3    | 3       | 0  |
| C5/1/0/U2 | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U3 | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/1/U0 | 4      | 0                 | 3    | 1    | 0    | 4        | 0    | 0           | 0    | 0    | 4    | 2       | 2  |
| C5/1/3/U0 | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 0       | 2  |
| -----     |        |                   |      |      |      |          |      |             |      |      |      |         |    |
| Total:    | 15     | v3.0: 0           |      |      |      | v1.1: 15 |      | WB : 0      |      |      |      | WB: 11  |    |
|           |        | v2.0: 14          |      |      |      | v1.0: 0  |      | scdm: 0     |      |      |      | NB: 4   |    |
|           |        | v1.1: 1           |      |      |      |          |      | atdm: 0     |      |      |      |         |    |
|           |        | v1.0: 0           |      |      |      |          |      | tdma: 15    |      |      |      |         |    |
| -----     |        |                   |      |      |      |          |      |             |      |      |      |         |    |

Beginning in Cisco IOS Release 12.2(33)SCD2, the output of the **show cable modem docsis version summary total** command was modified to display the cable modems that are in full or partial service mode as shown in the following example:

```
Router# show cable modem docsis version summary total
```

```

 Cable Modem DOCSIS Version Summary

```

| Interface | Online | DOCSIS Registered |      |      |      | US QoS   |      | US Phy Mode |      |      |    | DOCSIS Mode |    |    |  |
|-----------|--------|-------------------|------|------|------|----------|------|-------------|------|------|----|-------------|----|----|--|
|           |        | v3.0              | v2.0 | v1.1 | v1.0 | v1.1     | v1.0 | scdm        | atdm | tdma | UP | WB          | WP | NB |  |
| C7/0/0/UB | 12     | 12                | 0    | 0    | 0    | 12       | 0    | 0           | 0    | 0    | 9  | 12          | 12 | 0  |  |
| C7/0/0/U0 | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 2    | 0  | 0           | 0  | 2  |  |
| C7/0/0/U1 | 1      | 0                 | 1    | 0    | 0    | 1        | 0    | 0           | 0    | 1    | 0  | 0           | 0  | 1  |  |
| C7/0/0/U3 | 4      | 0                 | 4    | 0    | 0    | 4        | 0    | 0           | 0    | 4    | 0  | 0           | 0  | 4  |  |
| C8/0/0/UB | 9      | 9                 | 0    | 0    | 0    | 9        | 0    | 0           | 0    | 0    | 0  | 9           | 0  | 0  |  |
| C8/0/0/U0 | 1      | 1                 | 0    | 0    | 0    | 1        | 0    | 0           | 0    | 1    | 0  | 1           | 0  | 0  |  |
| C8/0/0/U1 | 5      | 0                 | 4    | 1    | 0    | 5        | 0    | 0           | 0    | 5    | 0  | 0           | 0  | 5  |  |
| C8/0/0/U3 | 1      | 0                 | 1    | 0    | 0    | 1        | 0    | 0           | 0    | 1    | 0  | 0           | 0  | 1  |  |
| -----     |        |                   |      |      |      |          |      |             |      |      |    |             |    |    |  |
| Total:    | 35     | v3.0: 22          |      |      |      | v1.1: 35 |      | UB : 21     |      |      |    | WB: 22      |    |    |  |
|           |        | v2.0: 12          |      |      |      | v1.0: 0  |      | UP : 9      |      |      |    | WP: 12      |    |    |  |
|           |        | v1.1: 1           |      |      |      |          |      | scdm: 0     |      |      |    | NB: 13      |    |    |  |
|           |        | v1.0: 0           |      |      |      |          |      | atdm: 0     |      |      |    |             |    |    |  |
|           |        |                   |      |      |      |          |      | tdma: 14    |      |      |    |             |    |    |  |
| -----     |        |                   |      |      |      |          |      |             |      |      |    |             |    |    |  |

**Examples: show cable modem docsis version summary cable total Command**

The following example shows sample output for the **show cable modem docsis version summary cable total** command for all enabled upstreams on a specific cable interface line card on a Cisco uBR10012 router:

Router# **show cable modem docsis version summary cable 5/1/0 total**

| Cable Modem DOCSIS Version Summary |        |                   |      |      |      |        |      |             |      |      |      |         |    |
|------------------------------------|--------|-------------------|------|------|------|--------|------|-------------|------|------|------|---------|----|
|                                    |        | DOCSIS Registered |      |      |      | US QoS |      | US Phy Mode |      |      |      | DS Mode |    |
| Interface                          | Online | v3.0              | v2.0 | v1.1 | v1.0 | v1.1   | v1.0 | WB          | scdm | atdm | tdma | WB      | NB |
| C5/1/0/U0                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U1                          | 3      | 0                 | 3    | 0    | 0    | 3      | 0    | 0           | 0    | 0    | 3    | 3       | 0  |
| C5/1/0/U2                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U3                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| Total:                             | 9      | 0                 | 9    | 0    | 0    | 9      | 0    | 0           | 0    | 0    | 9    | 9       | 0  |

Beginning in Cisco IOS Release 12.3(23)BC7, the output for the **show cable modem docsis version summary cable total** command was modified as shown in the following example:

Router# **show cable modem docsis version summary cable 5/1/0 total**

| Cable Modem DOCSIS Version Summary |        |                   |      |      |      |         |      |             |      |       |      |         |    |
|------------------------------------|--------|-------------------|------|------|------|---------|------|-------------|------|-------|------|---------|----|
|                                    |        | DOCSIS Registered |      |      |      | US QoS  |      | US Phy Mode |      |       |      | DS Mode |    |
| Interface                          | Online | v3.0              | v2.0 | v1.1 | v1.0 | v1.1    | v1.0 | WB          | scdm | atdm  | tdma | WB      | NB |
| C5/1/0/U0                          | 2      | 0                 | 2    | 0    | 0    | 2       | 0    | 0           | 0    | 0     | 2    | 2       | 0  |
| C5/1/0/U1                          | 3      | 0                 | 3    | 0    | 0    | 3       | 0    | 0           | 0    | 0     | 3    | 3       | 0  |
| C5/1/0/U2                          | 2      | 0                 | 2    | 0    | 0    | 2       | 0    | 0           | 0    | 0     | 2    | 2       | 0  |
| C5/1/0/U3                          | 2      | 0                 | 2    | 0    | 0    | 2       | 0    | 0           | 0    | 0     | 2    | 2       | 0  |
| Total:                             | 9      | v3.0: 0           |      |      |      | v1.1: 9 |      | WB : 0      |      | WB: 9 |      |         |    |
|                                    |        | v2.0: 9           |      |      |      | v1.0: 0 |      | scdm: 0     |      | NB: 0 |      |         |    |
|                                    |        | v1.1: 0           |      |      |      |         |      | atdm: 0     |      |       |      |         |    |
|                                    |        | v1.0: 0           |      |      |      |         |      | tdma: 9     |      |       |      |         |    |

The following example shows sample output for the **show cable modem docsis version summary cable total** command for a range of interfaces on the Cisco uBR10012 router:

Router# **show cable modem docsis version summary cable 5/1/0 cable 5/1/3 total**

| Cable Modem DOCSIS Version Summary |        |                   |      |      |      |        |      |             |      |      |      |         |    |
|------------------------------------|--------|-------------------|------|------|------|--------|------|-------------|------|------|------|---------|----|
|                                    |        | DOCSIS Registered |      |      |      | US QoS |      | US Phy Mode |      |      |      | DS Mode |    |
| Interface                          | Online | v3.0              | v2.0 | v1.1 | v1.0 | v1.1   | v1.0 | WB          | scdm | atdm | tdma | WB      | NB |
| C5/1/0/U0                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U1                          | 3      | 0                 | 3    | 0    | 0    | 3      | 0    | 0           | 0    | 0    | 3    | 3       | 0  |
| C5/1/0/U2                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U3                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/1/U0                          | 4      | 0                 | 3    | 1    | 0    | 4      | 0    | 0           | 0    | 0    | 4    | 2       | 2  |
| C5/1/3/U0                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 0       | 2  |
| Total:                             | 15     | 0                 | 14   | 1    | 0    | 15     | 0    | 0           | 0    | 0    | 15   | 11      | 4  |

Beginning in Cisco IOS Release 12.3(23)BC7, the output for the **show cable modem docsis version summary cable total** command for a range of interfaces was modified as shown in the following example:

Router# **show cable modem docsis version summary cable 5/1/0 cable 5/1/3 total**

| Cable Modem DOCSIS Version Summary |        |                   |      |      |      |          |      |             |      |      |      |         |    |
|------------------------------------|--------|-------------------|------|------|------|----------|------|-------------|------|------|------|---------|----|
|                                    |        | DOCSIS Registered |      |      |      | US QoS   |      | US Phy Mode |      |      |      | DS Mode |    |
| Interface                          | Online | v3.0              | v2.0 | v1.1 | v1.0 | v1.1     | v1.0 | WB          | scdm | atdm | tdma | WB      | NB |
| C5/1/0/U0                          | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U1                          | 3      | 0                 | 3    | 0    | 0    | 3        | 0    | 0           | 0    | 0    | 3    | 3       | 0  |
| C5/1/0/U2                          | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U3                          | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/1/U0                          | 4      | 0                 | 3    | 1    | 0    | 4        | 0    | 0           | 0    | 0    | 4    | 2       | 2  |
| C5/1/3/U0                          | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 0       | 2  |
| -----                              |        |                   |      |      |      |          |      |             |      |      |      |         |    |
| Total:                             | 15     | v3.0: 0           |      |      |      | v1.1: 15 |      | WB : 0      |      |      |      | WB: 11  |    |
|                                    |        | v2.0: 14          |      |      |      | v1.0: 0  |      | scdm: 0     |      |      |      | NB: 4   |    |
|                                    |        | v1.1: 1           |      |      |      |          |      | atdm: 0     |      |      |      |         |    |
|                                    |        | v1.0: 0           |      |      |      |          |      | tdma: 15    |      |      |      |         |    |
| -----                              |        |                   |      |      |      |          |      |             |      |      |      |         |    |

The following example shows sample output for the **show cable modem docsis version summary cable upstream total** command for a range of interfaces and upstreams on the Cisco uBR10012 router:

Router# **show cable modem docsis version summary cable 5/1/0 cable 5/1/3 upstream 0 3 total**

| Cable Modem DOCSIS Version Summary |        |                   |      |      |      |        |      |             |      |      |      |         |    |
|------------------------------------|--------|-------------------|------|------|------|--------|------|-------------|------|------|------|---------|----|
|                                    |        | DOCSIS Registered |      |      |      | US QoS |      | US Phy Mode |      |      |      | DS Mode |    |
| Interface                          | Online | v3.0              | v2.0 | v1.1 | v1.0 | v1.1   | v1.0 | WB          | scdm | atdm | tdma | WB      | NB |
| C5/1/0/U0                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U1                          | 3      | 0                 | 3    | 0    | 0    | 3      | 0    | 0           | 0    | 0    | 3    | 3       | 0  |
| C5/1/0/U2                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U3                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/1/U0                          | 4      | 0                 | 3    | 1    | 0    | 4      | 0    | 0           | 0    | 0    | 4    | 2       | 2  |
| C5/1/3/U0                          | 2      | 0                 | 2    | 0    | 0    | 2      | 0    | 0           | 0    | 0    | 2    | 0       | 2  |
| Total:                             | 15     | 0                 | 14   | 1    | 0    | 15     | 0    | 0           | 0    | 0    | 15   | 11      | 4  |

Beginning in Cisco IOS Release 12.3(23)BC7, the output for the **show cable modem docsis version summary cable upstream total** command for a range of interfaces and upstreams was modified as shown in the following example:

Router# **show cable modem docsis version summary cable 5/1/0 cable 5/1/3 upstream 0 3 total**

| Cable Modem DOCSIS Version Summary |        |                   |      |      |      |          |      |             |      |      |      |         |    |
|------------------------------------|--------|-------------------|------|------|------|----------|------|-------------|------|------|------|---------|----|
|                                    |        | DOCSIS Registered |      |      |      | US QoS   |      | US Phy Mode |      |      |      | DS Mode |    |
| Interface                          | Online | v3.0              | v2.0 | v1.1 | v1.0 | v1.1     | v1.0 | WB          | scdm | atdm | tdma | WB      | NB |
| C5/1/0/U0                          | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U1                          | 3      | 0                 | 3    | 0    | 0    | 3        | 0    | 0           | 0    | 0    | 3    | 3       | 0  |
| C5/1/0/U2                          | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/0/U3                          | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 2       | 0  |
| C5/1/1/U0                          | 4      | 0                 | 3    | 1    | 0    | 4        | 0    | 0           | 0    | 0    | 4    | 2       | 2  |
| C5/1/3/U0                          | 2      | 0                 | 2    | 0    | 0    | 2        | 0    | 0           | 0    | 0    | 2    | 0       | 2  |
| Total:                             | 15     | v3.0: 0           |      |      |      | v1.1: 15 |      | WB : 0      |      |      |      | WB: 11  |    |

# show cable modem docsis version

```

v2.0: 14 v1.0: 0 scdm: 0 NB: 4
v1.1: 1 atdm: 0
v1.0: 0 tdma: 15

```

The following example shows sample output for the **show cable modem docsis version summary cable upstream total** command for a range of upstreams in an interface on the Cisco uBR10012 router:

```
Router# show cable modem docsis version summary cable 5/1/0 upstream 0 3 total
```

```

Cable Modem DOCSIS Version Summary

 DOCSIS Registered US QoS US Phy Mode DS Mode

Interface Online v3.0 v2.0 v1.1 v1.0 v1.1 v1.0 WB scdm atdm tdma WB NB
C5/1/0/U0 2 0 2 0 0 2 0 0 0 0 2 2 0
C5/1/0/U1 3 0 3 0 0 3 0 0 0 0 3 3 0
C5/1/0/U2 2 0 2 0 0 2 0 0 0 0 2 2 0
C5/1/0/U3 2 0 2 0 0 2 0 0 0 0 2 2 0

Total: 9 0 9 0 0 9 0 0 0 0 9 9 0

```

Beginning in Cisco IOS Release 12.3(23)BC7, the output for the **show cable modem docsis version summary cable upstream total** command for a range of upstreams was modified as shown in the following example:

```
Router# show cable modem docsis version summary cable 5/1/0 upstream 0 3 total
```

```

Cable Modem DOCSIS Version Summary

 DOCSIS Registered US QoS US Phy Mode DS Mode

Interface Online v3.0 v2.0 v1.1 v1.0 v1.1 v1.0 WB scdm atdm tdma WB NB
C5/1/0/U0 2 0 2 0 0 2 0 0 0 0 2 2 0
C5/1/0/U1 3 0 3 0 0 3 0 0 0 0 3 3 0
C5/1/0/U2 2 0 2 0 0 2 0 0 0 0 2 2 0
C5/1/0/U3 2 0 2 0 0 2 0 0 0 0 2 2 0

Total: 9 v3.0: 0 v1.1: 9 WB : 0 WB: 9
 v2.0: 9 v1.0: 0 scdm: 0 NB: 0
 v1.1: 0 atdm: 0
 v1.0: 0 tdma: 9

```

The following example shows sample output for the **show cable modem cable docsis version summary** command for all enabled upstreams on a specific cable interface line card on a Cisco uBR10012 router:

```
Router# show cable modem cable 8/0/1 docsis version summary
```

```

Cable Modem DOCSIS Version Summary

 DOCSIS Registered US QoS US Phy Mode DS Mode

Interface Online v3.0 v2.0 v1.1 v1.0 v1.1 v1.0 WB scdm atdm tdma WB NB
C8/0/1/U0 4 0 2 1 1 0 4 0 0 0 4 0 4

```

Beginning in Cisco IOS Release 12.3(23)BC7, the output for the **show cable modem cable docsis version summary** command for a range of upstreams was modified as shown in the following example:

```
Router# show cable modem cable 8/0/1 docsis version summary
```

```

Cable Modem DOCSIS Version Summary

```

|           |        | DOCSIS Registered |      |      |      | US QoS |      | US Phy Mode |      |      |      | DS Mode |    |
|-----------|--------|-------------------|------|------|------|--------|------|-------------|------|------|------|---------|----|
|           |        | v3.0              | v2.0 | v1.1 | v1.0 | v1.1   | v1.0 | WB          | scdm | atdm | tdma | WB      | NB |
| Interface | Online |                   |      |      |      |        |      |             |      |      |      |         |    |
| C8/0/1/U0 | 4      | 0                 | 2    | 1    | 1    | 0      | 4    | 0           | 0    | 0    | 4    | 0       | 4  |

Table 3 describes the significant fields shown in the display.

**Table 102** *show cable modem docsis version summary Field Descriptions*

| Field             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface         | The cable interface line card providing the upstream for this cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Online            | Total number of cable modems currently online on this cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| DOCSIS Registered | Total number of cable modems registered on this cable interface with the specified DOCSIS version (x.y) capabilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| US QoS            | Total number of cable modems whose upstreams are currently operating in a specified DOCSIS version (x.y) quality of service (QoS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| US Phy Mode       | Total number of cable modems on this cable interface with upstreams currently operating in a particular wideband channel mode, where: <ul style="list-style-type: none"> <li>WB—Total number of upstreams on this cable interface operating in any wideband channel mode.</li> <li>scdma—Total number of upstreams on this cable interface operating in DOCSIS 2.0 Synchronous Code Division Multiple Access (SCDMA) mode.</li> <li>atdma—Total number of upstreams on this cable interface operating in DOCSIS 2.0 Advanced Time Division Multiple Access (A-TDMA) mode.</li> <li>tdma—Total number of upstreams on this cable interface operating in DOCSIS 1.X, Time Division Multiple Access (TDMA) mode.</li> </ul> |
| DS Mode           | Total number of cable modems on this cable interface whose downstreams are operating in the following modes: <ul style="list-style-type: none"> <li>WB—Total number of downstreams on this cable interface operating in wideband channel mode.</li> <li>NB—Total number of downstreams on this cable interface operating in narrowband channel mode.</li> </ul>                                                                                                                                                                                                                                                                                                                                                          |
| DOCSIS Mode       | <ul style="list-style-type: none"> <li>UP—Total number of cable modems in upstream bonding partial service mode (p).</li> <li>WB—Total number of cable modems in downstream bonding fully-operational mode (w-online).</li> <li>WP—Total number of cable modems in downstream bonding partial service mode (p-online).</li> <li>NB—Total number of cable modems in narrowband online mode (online).</li> </ul>                                                                                                                                                                                                                                                                                                           |

| Related Commands | Command                                     | Description                                                                                                             |
|------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                  | <b>show cable modem docsis device-class</b> | Displays the DOCSIS device-class information for cable modems (CMs) on all or specified cable interfaces and upstreams. |
|                  | <b>show cable modem partial-mode</b>        | Displays information about the cable modems that are in upstream and downstream partial service mode.                   |
|                  | <b>show cable modem rf-adapt</b>            | Displays RF adaptation information for cable modems.                                                                    |

# show cable modem domain-name

To update the cable-specific Domain Name System (DNS) cache and display the domain name for specified cable modems (CMs) and customer premise equipment (CPE) behind a CM on a Cisco CMTS router, use the **show cable modem domain-name** command in privileged EXEC mode.

## Cisco uBR7246VXR Router and Cisco uBR7225VXR Router

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] domain-name
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
domain-name
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                           |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                                   |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

## show cable modem domain-name

|                              |                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream port</b>         | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <b>logical-channel-index</b> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                  |
| <b>name fqdn</b>             | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |

### Command Modes

Privileged EXEC (#)

### Command History

| Release     | Modification                                                                                       |
|-------------|----------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was introduced.                                                                       |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> . |
| 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                    |

### Usage Guidelines

Use the **show cable modem domain-name** command without any options to initiate an update to the cable-specific DNS cache on the CMTS router and to enable use of domain names in other CMTS router **cable modem** commands that support a name option.



#### Note

In Cisco IOS Release 12.2(33)SCA, although the **show cable modem domain-name** command accepts an IPv4 address format for a CM, DNS for IPv4-managed cable devices is not supported.

### Examples

The following example shows sample output for all CMs and CPE behind a CM for the **show cable modem domain-name** command, listing the devices by their MAC and IP addresses and displaying the associated domain name:

```
Router# show cable modem domain-name
```

| MAC Address    | IP Address                             | Domain Name              |
|----------------|----------------------------------------|--------------------------|
| 0018.6835.27b3 | 10.3.37.76                             |                          |
| 0019.474a.c14a | 2001:0DB8:3800:809:A896:1431:75EA:5EA1 | cisco-test-cm1.cisco.com |
| 0007.0e03.6851 | 10.3.37.36                             |                          |
| 0007.0e01.b085 | 10.3.37.34                             |                          |
| 0018.6835.27aa | 2001:0DB8:3800:809:E97D:2986:9F37:FFE  | cisco-test-cm2.cisco.com |

### Related Commands



| Command                              | Description                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                  |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                     |
| <b>show cable modem calls</b>        | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                |
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more cable modems.                                                       |
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems.                                  |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                                                       |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                              |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                                                    |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                                     |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                             |

# show cable modem errors

To display packet header error statistics for one or more CMs, use the **show cable modem errors** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] errors
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
errors
```

### Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                           |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                                   |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <i>upstream port</i>         | (Optional) Displays information for all CMs using this specific upstream. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports on the cable interface line card.                                                                                                                                                                              |

|                              |                                                                                                                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                      |
| <b>name</b> <i>fqdn</i>      | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |
| <b>errors</b>                | Displays packet header error statistics for one or more CMs.                                                                                                                                                                                                        |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release                              | Modification                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX, 12.2(1)XF, and 12.2(4)BC1 | This command was introduced for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 router.                                                                                                                                                                                                                                                                                   |
| 12.2(33)SCA                          | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |
| 12.2(33)SCE                          | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                           |
| 12.2(33)SCF                          | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                              |

**Usage Guidelines**

This command displays packet header error information for all CMs, for all CMs attached to a specific CMTS cable interface, or for a particular CM, as identified by its IP address or MAC address.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration**

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring,

CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

**Tip**

In Cisco IOS Release 12.2(15)BC1 and later releases, use the **clear cable modem flap-counters** command to clear these counters.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Examples**

The following example shows sample output for the **show cable modem errors** command for all CMs on a particular cable interface.

```
Router# show cable modem c8/1/0 errors
```

```
MAC Address I/F CRC HCS
0050.7366.1243 C8/1/0/U1 0 1
0002.b970.0027 C8/1/0/U4 0 0
0006.5314.858d C8/1/0/U4 8 3
```

```
Router#
```

[Table 103](#) describes the fields shown in the **show cable modem errors** displays:

**Table 103** Descriptions for the show cable modem errors Fields

| Field       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address | The MAC address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| I/F         | The cable interface line card, including the upstream, for this CM.                                                                                                                                                                                                                                                                                                                                                                                |
| CRC         | Number of times the CMTS upstream receiver flagged a packet with a cyclic redundancy check (CRC) error from this CM. CRC errors usually indicate downstream signal interruption or interference noise on a plant. Occasional CRC errors can always be expected, but a high number of CRC errors could indicate plant problems such as intermittent upstream problems, laster clipping, common-path distortion, or impulsive noise or interference. |
| HCS         | Number of times the CMTS upstream receiver flagged a packet with a header checksum (HCS) error from this CM. HCS errors could indicate the same sort of plant problems as CRC errors.                                                                                                                                                                                                                                                              |

**Related Commands**

| Command                   | Description                                                                      |
|---------------------------|----------------------------------------------------------------------------------|
| <b>cable modem vendor</b> | Associates the name of a vendor with its Organizational Unique Identifier (OUI). |
| <b>show cable modem</b>   | Displays information for the registered and unregistered CMs.                    |

| Command                              | Description                                                                                        |
|--------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem. |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                              |
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more cable modems.                                        |
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems.                   |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                      |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                               |

# show cable modem extended-power

To display the list of cable modems that are transmitting upstream data at extended power level, use the **show cable modem extended-power** command in privilege EXEC mode.

**show cable modem extended-power**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.2(33)SCF2 | This command was introduced. |

Examples

The following is a sample output of the **show cable modem extended-power** command that displays all the cable modems that are transmitting upstream data at extended power level:

```
Router# show cable modem extended-power

MAC Address IP Address I/F MAC Prim Report ECN
 State Power
001e.6bfb.3382 5.50.0.3 C7/0/0/UB w-online 3 57.00 Y
0022.cea5.0214 5.50.1.102 C7/0/0/UB w-online 5 54.00 Y
001e.6bfb.1378 5.50.6.83 C7/0/0/UB w-online 6 54.00 Y
```

[Table 1](#) describes significant fields shown in the display.

**Table 104** show cable modem extended-power Field Descriptions

| Field        | Description                                                           |
|--------------|-----------------------------------------------------------------------|
| MAC Address  | MAC address of the cable modem.                                       |
| IP Address   | IP address that the DHCP server has assigned to the cable modem.      |
| I/F          | Cable interface line card providing the upstream for the cable modem. |
| MAC State    | Current state of the MAC layer.                                       |
| Prim Sid     | Primary Service ID (SID) assigned to the cable modem.                 |
| Report Power | Power (in dB) at which cable modems are transmitting upstream data.   |
| ECN          | Extended high power at which the CM is operating.                     |

**Related Commands**

| Command                             | Description                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------|
| <b>cable upstream<br/>ext-power</b> | Enables or disables the DOCSIS extended transmit power support on the Cisco CMTS. |

# show cable modem flap

To display flap list statistics for one or more cable modems, use the **show cable modem flap** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] flap
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn] flap
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific cable modem to be displayed. If you specify the IP address for a CPE device behind a cable modem, information for that cable modem is displayed.                                                                                                                                                                                                                                                                                            |
| <i>mac-address</i>           | (Optional) MAC address of a specific cable modem to be displayed. If you specify the MAC address for a CPE device behind a cable modem, information for that cable modem is displayed.                                                                                                                                                                                                                                                                                                    |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <i>upstream port</i>         | (Optional) Displays information for all cable modems using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card.                                                                                                                                                  |



|                              |                                                                                                                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                      |
| <b>name fqdn</b>             | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |
| <b>flap mtc</b>              | Displays aggregate data across all upstream channels for each flap detector for cable modems in MTC mode. Displays per channel flap information for a single cable modem in MTC mode.                                                                               |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release                              | Modification                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX, 12.2(1)XF, and 12.2(4)BC1 | This command was introduced for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers.                                                                                                                                                                                                                                                                                                              |
| 12.2(33)SCA                          | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a cable modem or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a cable modem.</li> </ul>           |
| 12.2(33)SCC                          | A new keyword, <b>mtc</b> , was added to provide multiple transmit channel (MTC) information for cable modems in the MTC mode. <ul style="list-style-type: none"> <li>The <b>mtc</b> keyword displays aggregate data across all upstream channels for each flap detector for cable modems in the MTC mode.</li> <li>The <b>show cable modem flap</b> command remains unchanged for non-MTC mode cable modems.</li> </ul> |
| 12.2(33)SCE                          | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                                                       |
| 12.2(33)SCF                          | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                                                          |

**Usage Guidelines**

This command displays information about the flap list activity for one or more cable modems. Unlike the **show cable flap-list** command, the **show cable modem flap** command displays flap counters of a cable modem irrespective of the plant condition.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration**

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

For cable modems in MTC mode, the **show cable modem flap** command will display aggregate data across all upstream channels for each flap detector. However, for a single MTC cable modem, the **show cable modem flap** command will display per channel flap information.

**Note**

The output of the **show cable modem flap** command will remain unchanged for non-MTC mode cable modems.

**Examples**

The following example shows sample output for the **show cable modem flap** command on a Cisco CMTS router:

```
Router# show cable modem flap
```

| MAC Address    | I/F       | Ins | Hit   | Miss | CRC | P-Adj  | Flap  | Time                       |
|----------------|-----------|-----|-------|------|-----|--------|-------|----------------------------|
| 0025.2e34.4386 | C6/0/0/U0 | 0   | 46657 | 3974 | 0   | 0      | 0     | (14212 msec)               |
| 0025.2e2f.d4b6 | C6/0/0/U0 | 0   | 47868 | 1896 | 0   | 0      | 0     | (18000 msec)               |
| 0025.2e2f.d4de | C6/0/0/U0 | 0   | 47960 | 1883 | 0   | 0      | 0     | (19552 msec)               |
| 0023.bee1.e96b | C6/0/0/U0 | 0   | 46537 | 4333 | 0   | 0      | 0     | (22432 msec)               |
| 0025.2e2f.d4d8 | C6/0/0/U0 | 0   | 21891 | 780  | 0   | 0      | 0     | ( -- )                     |
| 0025.2e2f.d48c | C6/0/0/U0 | 0   | 47918 | 1828 | 0   | 0      | 0     | ( -- )                     |
| 0025.2e2f.d490 | C6/0/0/U0 | 0   | 47900 | 1812 | 0   | 0      | 0     | ( -- )                     |
| 0019.474e.e46a | C8/0/0/U0 | 0   | 33424 | 0    | 0   | 0      | 0     | (6372 msec)                |
| 0019.474e.e266 | C8/0/0/U0 | 0   | 33418 | 0    | 0   | 0      | 0     | (8352 msec)                |
| 0022.ce89.96f2 | C8/0/0/U0 | 0   | 33427 | 0    | 0   | 0      | 0     | (11112 msec)               |
| 0025.2e2f.d58a | C8/0/0/U0 | 0   | 33423 | 0    | 0   | !33420 | 33420 | Oct 5 16:02:16(15252 msec) |
| 001a.c30c.7ef6 | C8/0/0/U0 | 0   | 33424 | 2    | 0   | 0      | 0     | (17592 msec)               |
| 0022.ce89.96b0 | C8/0/0/U0 | 0   | 33414 | 0    | 0   | 0      | 0     | ( -- )                     |
| 0025.2e2f.d6de | C8/0/0/U0 | 0   | 33414 | 0    | 0   | !33411 | 33411 | Oct 5 16:02:21( -- )       |
| 0025.2e34.43c8 | C8/0/0/U0 | 0   | 33411 | 0    | 0   | 0      | 0     | ( -- )                     |
| 0023.bee1.e974 | C8/0/0/U0 | 0   | 33406 | 0    | 0   | 0      | 0     | ( -- )                     |
| 0019.474e.e3a7 | C8/0/0/U0 | 0   | 33324 | 0    | 0   | 0      | 0     | ( -- )                     |

The following example shows sample output for the **show cable modem flap** command for all cable modems on a specific cable interface:

Router# **show cable modem c6/0/0 flap**

| MAC Address    | I/F       | Ins | Hit   | Miss | CRC | P-Adj | Flap | Time         |
|----------------|-----------|-----|-------|------|-----|-------|------|--------------|
| 0025.2e34.4386 | C6/0/0/U0 | 0   | 46778 | 3980 | 0   | 0     | 0    | (14212 msec) |
| 0025.2e2f.d4b6 | C6/0/0/U0 | 0   | 48002 | 1899 | 0   | 0     | 0    | (18000 msec) |
| 0025.2e2f.d4de | C6/0/0/U0 | 0   | 48098 | 1889 | 0   | 0     | 0    | (19552 msec) |
| 0023.bee1.e96b | C6/0/0/U0 | 0   | 46658 | 4351 | 0   | 0     | 0    | (22432 msec) |
| 0025.2e2f.d4d8 | C6/0/0/U0 | 0   | 21979 | 781  | 0   | 0     | 0    | ( -- )       |
| 0025.2e2f.d48c | C6/0/0/U0 | 0   | 48048 | 1835 | 0   | 0     | 0    | ( -- )       |
| 0025.2e2f.d490 | C6/0/0/U0 | 0   | 48029 | 1819 | 0   | 0     | 0    | ( -- )       |

The following example shows sample output for the **show cable modem flap** command for a particular cable modem:

Router# **show cable modem 0010.7bb3.fcd1 flap**

| MAC Address    | I/F     | Ins | Hit   | Miss | CRC | P-Adj | Flap | Time                        |
|----------------|---------|-----|-------|------|-----|-------|------|-----------------------------|
| 0010.7bb3.fcd1 | C5/0/U5 | 0   | 36278 | 92   | 0   | 369   | 372  | Jun 1 13:05:23 (14212 msec) |

The following example shows sample output of the **show cable modem flap** command for all cable modems in the MTC mode on a specific cable interface:

Router# **show cable modem c5/0/0 flap**

| MAC Address    | I/F       | Ins | Hit   | Miss | CRC | P-Adj | Flap | Time                         |
|----------------|-----------|-----|-------|------|-----|-------|------|------------------------------|
| 000e.5c44.d2f0 | C5/0/0/U0 | 0   | 3040  | 0    | 0   | 0     | 0    | ( -- )                       |
| 0019.474a.d542 | C5/0/0/U3 | 0   | 2930  | 214  | 0   | 0     | 1    | May 27 05:21:26 (19552 msec) |
| 001a.c3ff.d578 | C5/0/0/UB | 0   | 12195 | 60   | 0   | 0     | 4    | May 25 10:01:03 (22432 msec) |

Table 105 describes the significant fields shown in the display:

**Table 105** *show cable modem flap Field Descriptions*

| Field       | Description                                                                                                                                                                                                                              |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address | The MAC address for the CM.                                                                                                                                                                                                              |
| I/F         | The cable interface line card, including upstream, for this cable modem.                                                                                                                                                                 |
| Ins         | The number of times the cable modem comes up and inserts itself into the network. It can indicate intermittent downstream sync loss or DHCP or modem registration problems.                                                              |
| Hit         | The number of times the cable modem responds to MAC layer keepalive messages. (The minimum hit rate is once per 30 seconds. It can indicate intermittent upstream, laser clipping, or common-path distortion.                            |
| Miss        | The number of times the cable modem misses the MAC layer keepalive message. An 8 percent miss rate is normal for the Cisco cable interface line cards. It can indicate intermittent upstream, laser clipping, or common-path distortion. |
| CRC         | The number of cyclic redundancy check (CRC) errors from this cable modem. It can indicate intermittent upstream, laser clipping, or common-path distortion.                                                                              |
| P-Adj       | The number of times the headend instructed the cable modem to adjust transmit (TX) power more than 3 dB. It can indicate amplifier degradation, poor connections, or thermal sensitivity.                                                |

**Table 105** *show cable modem flap Field Descriptions (continued) (continued)*

| Field | Description                                                                                                                                                                                                                                                                      |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flap  | The sum of P-Adj and Ins values. cable modems with high flap counts have high SIDs and might not register.                                                                                                                                                                       |
| Time  | The most recent time that the cable modem dropped the connection. The value displayed in the brackets indicates the duration (milliseconds) between the cable interface to become active and the first ranging success after a line card switchover (cable modem recovery time). |

**Related Commands**

| Command                                       | Description                                                                                                 |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>cable flap-list aging</b>                  | Specifies the number of days to keep a cable modem in the flap-list table before aging it out of the table. |
| <b>cable flap-list insertion-time</b>         | Sets the insertion time interval that determines whether a cable modem is placed in the flap list.          |
| <b>cable flap-list miss-threshold</b>         | Configures the threshold for recording a flap-list event, in terms of missed Station Maintenance messages.  |
| <b>cable flap-list power-adjust threshold</b> | Specifies the power-adjust threshold for recording a cable modem flap-list event.                           |
| <b>cable flap-list size</b>                   | Specifies the maximum number of cable modems that can be listed in the flap-list table.                     |
| <b>clear cable flap-list</b>                  | Clears all the entries in the flap-list table.                                                              |
| <b>show cable flap-list</b>                   | Displays the current contents of the flap list.                                                             |
| <b>show cable modem</b>                       | Displays information for the registered and unregistered cable modems.                                      |
| <b>show cable modem rf-adapt</b>              | Displays RF adaptation information for cable modems.                                                        |
| <b>show interface cable modem</b>             | Displays information about the cable modems connected to a particular cable interface.                      |

# show cable modem ipv6

To display IPv6 information for specified cable modems (CMs) and customer premise equipment (CPE) behind a CM on a Cisco CMTS router, use the **show cable modem ipv6** command in privileged EXEC mode.

## Cisco uBR7246VXR Router and Cisco uBR7225VXR Router

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] ipv6 [cpe | prefix | registered |
unregistered]
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn] ipv6
[cpe | prefix | registered | unregistered]
```

| Syntax                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                           |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                                   |
| <b>cable</b>                 | Identifies the cable interface on the Cisco router.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

|                              |                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream port</b>         | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <b>logical-channel-index</b> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                  |
| <b>name fqdn</b>             | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |
| <b>cpe</b>                   | (Optional) Displays IPv6 information for the CPE devices behind the CM with the specified IPv4 or IPv6 address.                                                                                                                                                                                                                 |
| <b>prefix</b>                | (Optional) Displays the IPv6 prefix of the network.                                                                                                                                                                                                                                                                             |
| <b>registered</b>            | (Optional) Displays IPv6 information for registered CMs.                                                                                                                                                                                                                                                                        |
| <b>unregistered</b>          | (Optional) Displays IPv6 information for unregistered CMs.                                                                                                                                                                                                                                                                      |

#### Command Modes

Privileged EXEC (#)

#### Command History

| Release      | Modification                                                                                       |
|--------------|----------------------------------------------------------------------------------------------------|
| 12.2(33)SCA  | This command was introduced.                                                                       |
| 12.2(33)SCE  | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> . |
| 12.2(33)SCF  | This command was modified. The <i>logical-channel-index</i> argument was added.                    |
| 12.2(33)SCG1 | The output for the <b>show cable modem mac-address ipv6 cpe</b> has been modified.                 |

#### Usage Guidelines

Use the **show cable modem ipv6** command without any options to display IPv6 information for all CMs on the CMTS router.

Using the keyword options, you can display IPv6 information by IP address (IPv4 or IPv6) of a particular CM, for all CMs associated with a specified cable interface, by MAC address of a CM, or by domain name of a CM.



#### Note

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the Cisco CMTS router before any domain name can be used as part of a cable command.

To display the number of CPEs behind a CM, use the **show cable modem ipv6 registered** command.

To display CPE information behind a specific CM, use the **show cable modem mac-address ipv6 cpe** command.

**Examples****IPv6 Information for all CMs**

The following example shows sample output for the **show cable modem ipv6** command for all CMs on the Cisco CMTS routers, listing the devices by their MAC and IP addresses and displaying the associated domain name:

```
Router# show cable modem ipv6
```

| MAC Address    | Type | Interface | Mac State | D/IP | IP Address                             |
|----------------|------|-----------|-----------|------|----------------------------------------|
| 0004.27a5.b761 | B/D  | C6/0/2/U1 | online    | N    | ---                                    |
| 0007.0e01.d9a1 | B/D  | C6/0/2/U0 | online    | N    | ---                                    |
| 0006.2854.7275 | R/D  | C6/0/2/U1 | online    | Y    | 2001:0DB8:3800:80B:7565:5B87:1D7D:5AD5 |

**IPv6 prefix information for all CMs**

The following example shows sample output for the **show cable modem ipv6 prefix** command for all CMs on the Cisco CMTS routers:

```
Router# show cable modem ipv6 prefix
```

```
Device Type: B - CM Bridge, R - CM Router
IP Assignment Method: D - DHCP
MAC Address Type D/IP IPv6 prefix
0006.2854.7275 R/D Y 2001:0DB8:3800:80C::/64
```

Starting with Cisco IOS Release 12.2(33)SCG1, the output for the **show cable modem ipv6 prefix** command displays multiple IPv6 prefix assigned. The D/IP field is not supported. The following example shows the sample output for the **show cable modem ipv6 prefix** command for all CMs on the Cisco CMTS router:

```
Router# show cable modem ipv6 prefix
```

```
Load for five secs: 1%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *06:36:53.075 UTC Thu Aug 2 2012
Device Type: B - CM Bridge, R - CM Router
IP Assignment Method: D - DHCP

MAC Address Type IPv6 prefix
0023.bed9.4c91 R/D 2001:40:1012::/64
 R/D 2001:40:2012:1::/64
0000.002e.074c R/D 2001:40:1012:8::/64
 R/D 2001:40:2012:1D::/64
0000.002e.074b R/D 2001:40:1012:23::/64
 R/D 2001:40:2012:1C::/64
0000.002e.074a R/D 2001:40:1012:22::/64
 R/D 2001:40:2012:1B::/64
```

Starting with Cisco IOS Release 12.2(33)SCG1, the following example shows sample output for the **show cable modem mac-address ipv6 prefix** command for multiple IPv6 prefixes assigned to CPEs behind a CM with a specific MAC address on the Cisco CMTS router:

```
Router# show cable modem 0023.bed9.4c8e ipv6 prefix
```

```
Load for five secs: 0%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *06:37:22.335 UTC Thu Aug 2 2012
Device Type: B - CM Bridge, R - CM Router
IP Assignment Method: D - DHCP

MAC Address Type IPv6 prefix
0023.bed9.4c91 R/D 2001:40:1012::/64
 R/D 2001:40:2012:1::/64
```

**Example of the show cable modem ipv6 Command for all Registered CMs**

The following example shows sample output for the **show cable modem ipv6 registered** command for all registered CMs on the Cisco CMTS router:

```
Router# show cable modem ipv6 registered
```

| Interface | Prim<br>Sid | Online<br>State | CPE | IP Address                             | MAC Address    |
|-----------|-------------|-----------------|-----|----------------------------------------|----------------|
| C4/0/U2   | 1           | online          | 0   | ---                                    | 0018.6835.27b3 |
| C4/0/U2   | 2           | online          | 0   | 2001:0DB8:3800:809:A896:1431:75EA:5EA1 | 0019.474a.c14a |
| C4/1/U1   | 2           | online          | 0   | ---                                    | 0007.0e03.6851 |
| C4/1/U1   | 3           | online          | 0   | ---                                    | 0007.0e01.b085 |
| C4/1/U1   | 4           | online          | 0   | 2001:0DB8:3800:809:E97D:2986:9F37:FFE  | 0018.6835.27aa |

**Example of the show cable modem ipv6 cpe Command for all CMs**

The following example shows sample output for the **show cable modem ipv6 cpe** command for all CMs on the Cisco CMTS router:

```
Router# show cable modem 0019.474a.c14a ipv6 cpe
```

| MAC Address    | IP Address                            | Domain Name |
|----------------|---------------------------------------|-------------|
| 0005.0052.2c1d | 2001:420:3800:809:48F7:3C33:B774:9185 |             |

Starting with Cisco IOS Release 12.2(33)SCG1, the following example shows sample output for the **show cable modem mac-address ipv6 cpe** command for registered CMs on the Cisco CMTS router:

```
Router# show cable modem 0023.bed9.4c8e ipv6 cpe
```

Load for five secs: 0%/0%; one minute: 1%; five minutes: 1%  
Time source is hardware calendar, \*06:37:20.439 UTC Thu Aug 2 2012

| MAC Address    | IP Address                     |
|----------------|--------------------------------|
| 0023.bed9.4c91 | 2001:40:3:4:200:5EB7:BB6:C759  |
|                | 2001:40:3:4:210:D73B:7A50:2D05 |

[Table 106](#) describes the significant fields shown in the display.

**Table 106 show cable modem ipv6 Field Descriptions**

| Field       | Description                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address | MAC address of this CM.                                                                                                                                                                                                                                                                                                                                                                                                                |
| Type        | Type of device that this CM is functioning as, with the following possible values: <ul style="list-style-type: none"> <li>B/D—CM as bridge using DHCP address assignment.</li> <li>G/D—CPE router using DHCP address assignment.</li> <li>C/A—CPE using Stateless Address Auto-Configuration (SLAAC) address assignment.</li> </ul> <p><b>Note</b> In Cisco IOS Release 12.2(33)SCA, the Cisco CMTS router does not support SLAAC.</p> |
| Interface   | Cable line card interface and upstream associated with this CM.                                                                                                                                                                                                                                                                                                                                                                        |
| Mac State   | The current state of the MAC layer for this CM (See <a href="#">Table 107</a> for descriptions of the possible states).                                                                                                                                                                                                                                                                                                                |



**Table 106** *show cable modem ipv6 Field Descriptions (continued)*

| Field       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D/IP        | Dual IP flag. Identifies whether or not (“Y” or “N”) the CM or CPE supports both IPv4 and IPv6 addressing.<br><br>Starting from Cisco IOS Release 12.2(33)SCG1, D/IP field is not supported.                                                                                                                                                                                                                                                                                                       |
| IP Address  | IP address acquired by the CM. Prior to acquisition of the IP address, or if the CM fails registration, the following output is shown: <ul style="list-style-type: none"> <li>IPv4 address not yet acquired—”0.0.0.0”</li> <li>IPv6 address not yet acquired—“::”</li> <li>CM fails IPv6 registration, but online with IPv4 address or CM fails IPv4 registration, but online with IPv6 address: “---”</li> <li>IPv6 address of IPv4-only CM, or IPv4 address of an IPv6-only CM: “---”</li> </ul> |
| Domain Name | Domain name for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 107 shows the possible values for the MAC state field:

**Table 107** *Descriptions for the MAC State Field <sup>1</sup>*

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Registration and Provisioning Status Conditions for Devices Using IPv4 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| init(r1)                                                                                 | The CM sent initial ranging.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| init(r2)                                                                                 | The CM is ranging. The CMTS received initial ranging from the Cm and has sent RF power, timing offset, and frequency adjustments to the CM.                                                                                                                                                                                                                                                                                                                                                                     |
| init(rc)                                                                                 | Ranging has completed.<br><br><b>Note</b> If a CM appears to be stuck in this state, it could be that the CM is able to communicate successfully on the cable network, but that the upstream is at capacity and does not have any additional bandwidth to allow the CM to finish registration and come online. Either manually move one or more CMs to other upstreams, or enable load balancing on the upstream using the <b>cable load-balance group</b> commands.                                            |
| init(d)                                                                                  | The DHCP request was received, as DHCPDISCOVER. This also indicates that the first IP broadcast packet has been received from the CM.                                                                                                                                                                                                                                                                                                                                                                           |
| init(dr)                                                                                 | The DHCP request has been sent to the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init(i)                                                                                  | The cable modem has received the DHCPOFFER reply (DHCPACK) from the DHCP server that has assigned an IP address to the modem, but the modem has not yet replied with a DHCPREQUEST message requesting that particular IP address, nor has it sent an IP packet with that IP address.<br><br><b>Note</b> If a CM appears to be stuck in this state, the CM has likely received the DHCPOFFER reply from the DHCP server, but this reply might have contained one or more invalid options for that particular CM. |

**Table 107** Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| init(io)                                                                                 | The Cisco CMTS has seen the DHCP offer as sent to the cable modem from the DHCP server that has assigned an IP address to the modem.                                                                                                                                                                                                                                                                                                                                                                                                       |
| init(o)                                                                                  | The CM has begun to download the option file (DOCSIS configuration file) using the Trivial File Transfer Protocol (TFTP), as specified in the DHCP response. If the CM remains in this state, it indicates that the download has failed.                                                                                                                                                                                                                                                                                                   |
| init(t)                                                                                  | Time-of-day (TOD) exchange has started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| resetting                                                                                | The CM is being reset and will shortly restart the registration process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Registration and Provisioning Status Conditions for Devices Using IPv6 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| init6(s)                                                                                 | The Cisco CMTS router has seen the DHCPv6 SOLICIT message from the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| init6(a)                                                                                 | The Cisco CMTS router has seen the ADVERTISE message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| init6(r)                                                                                 | The Cisco CMTS router has seen the REQUEST response from the CM to the DHCPv6 server.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| init6(i)                                                                                 | The Cisco CMTS router has seen the REPLY message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| init6(o)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TFTP server.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| init6(t)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TOD server.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Non-error Status Conditions</b>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| cc(r1)                                                                                   | The CM had registered and was online, but has received a Downstream Channel Change (DCC) or Upstream Channel Change (UCC) request message from the CMTS. The CM has begun moving to the new channel, and the CMTS has received the CM's initial ranging on the new downstream or upstream channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                        |
| cc(r2)                                                                                   | This state should normally follow cc(r1) and indicates that the CM has finished its initial ranging on the new channel, and is currently performing continuous ranging on the new channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                                                                                                                                |
| offline                                                                                  | The CM is considered offline (disconnected or powered down).                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| online                                                                                   | The CM has registered and is enabled to pass data on the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| online(d)                                                                                | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. The CM does not forward traffic to or from the CPE devices, but the CMTS can continue to communicate with the CM using DOCSIS messages and IP traffic (such as SNMP commands).</p> <p><b>Note</b> If BPI was enabled in the DOCSIS configuration file sent to the CM, assume that the CM is using BPI encryption, unless other messages show that the BPI negotiation and key assignments have failed.</p> |

**Table 107** Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value                                                                                                                                                                                                                                                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| online(pkd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and KEK is assigned.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pk) states.</p>                                                                                                                                                                                                                                                                                                                                    |
| online(ptd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pt) states.</p>                                                                                                                                                                                                                                                                                             |
| online(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| online(pt)                                                                                                                                                                                                                                                                                             | <p>The CM registered, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> If network access was disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) instead of online(pt) even when BPI encryption is enabled and operational.</p>                                                                                                                                                                                                                                   |
| <p><b>Note</b> If an exclamation point (!) appears in front of one of the online states, it indicates that the <b>cable dynamic-secret</b> command has been used with either the <b>mark</b> or <b>reject</b> option, and that the cable modem has failed the dynamic secret authentication check.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| expire(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| expire(pkd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pk) states.</p>                                                                                                                                                                                                                                                  |
| expire(pt)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| expire(ptd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pt) states.</p>                                                                                                                                                                                                                                                  |
| <b>Error Status Conditions</b>                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| reject(m)                                                                                                                                                                                                                                                                                              | <p>The CM attempted to register but registration was refused due to a bad Message Integrity Check (MIC) value. This also could indicate that the shared secret in the DOCSIS configuration file does not match the value configured on the CMTS with the <b>cable shared-secret</b> command.</p> <p>In Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases, this could also indicate that the <b>cable tftp-enforce</b> command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so.</p> |

**Table 107** Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| reject(c)       | <p>The CM attempted to register, but registration was refused due to a number of possible errors:</p> <ul style="list-style-type: none"> <li>• The CM attempted to register with a minimum guaranteed upstream bandwidth that would exceed the limits imposed by the <b>cable upstream admission-control</b> command.</li> <li>• The CM has been disabled because of a security violation.</li> <li>• A bad class of service (COS) value in the DOCSIS configuration file.</li> <li>• The CM attempted to create a new COS configuration but the CMTS is configured to not permit such changes.</li> <li>• The CM failed the timestamp check for its DOCSIS configuration file. (This could indicate a possible theft-of-service attempt, or a problem with the synchronization of the clocks on the CM and CMTS.)</li> </ul> |
| reject(pk)      | KEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(pkd)     | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pk) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| reject(pt)      | TEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(ptd)     | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>     | <p>In Cisco IOS Release 12.1(20)EC, Cisco IOS Release 12.2(15)BC1, and earlier releases, when network access is disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) even if BPI encryption fails. Use the <b>show cable modem mac-address</b> command to confirm whether BPI is enabled or disabled for a particular cable modem.</p>                                                                                                                                                                                                                                                                                                                                                                                            |
| reject(ts)      | The CM attempted to register, but registration failed because the TFTP server timestamp in the CM registration request did not match the timestamp maintained by the CMTS. This might indicate that the CM attempted to register by replaying an old DOCSIS configuration file used during a prior registration attempt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(ip)      | The CM attempted to register, but registration failed because the IP address in the CM request did not match the IP address that the TFTP server recorded when it sent the DOCSIS configuration file to the CM. IP spoofing could be occurring.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| reject(na)      | The CM attempted to register, but registration failed because the CM did not send a Registration-Acknowledgement (REG-ACK) message in reply to the Registration-Response (REG-RSP) message sent by the CMTS. A Registration-NonAcknowledgement (REG-NACK) is assumed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

1. The CM MAC state field can also be retrieved using SNMP by getting the value of the cdxCmtsCmStatusValue object in the CISCO-DOCS-EXT-MIB.

## Related Commands

| Command                           | Description                                                                      |
|-----------------------------------|----------------------------------------------------------------------------------|
| <b>cable modem vendor</b>         | Associates the name of a vendor with its Organizational Unique Identifier (OUI). |
| <b>show cable modem</b>           | Displays information for the registered and unregistered CMs.                    |
| <b>show cable modem rf-adapt</b>  | Displays RF adaptation information for cable modems.                             |
| <b>show interface cable modem</b> | Displays information about the CMs connected to a particular cable interface.    |

# show cable modem mac

To display MAC layer information for one or more CMs, use the **show cable modem mac** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] mac[summary [total]]
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
mac[summary [total]]
```

|                    |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | ip-address            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                       |
|                    | mac-address           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                               |
|                    | slot                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
|                    | subslot               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
|                    | port                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
|                    | cable-interface-index | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

|                                 |                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream</b> <i>port</i>     | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <i>logical-channel-index</i>    | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                  |
| <b>name</b> <i>fqdn</i>         | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |
| <b>summary</b> [ <b>total</b> ] | (Optional) Displays a summary of MAC layer information for each cable interface. If you add the optional <b>total</b> keyword, the display includes a total of CMs that are included in each of the displayed fields.                                                                                                           |

**Defaults**

Displays MAC layer information for all CMs.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release                  | Modification                                                                                                                                                                                                                            |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX and 12.2(4)BC1 | This command was introduced for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers.                                                                                                                             |
| 12.2(8)BC2               | This command was enhanced to show whether a CM is capable of operating in DOCSIS 1.0 or DOCSIS 1.1 mode, and the version for which it is currently provisioned.                                                                         |
| 12.2(11)BC1              | The <b>mac</b> option was enhanced to support the <b>summary</b> and <b>summary total</b> options.                                                                                                                                      |
| 12.2(15)CX               | This command was enhanced to support DOCSIS 2.0 CMs using Advanced Time Division Multiple Access (A-TDMA) modulation profiles.                                                                                                          |
| 12.3(17a)BC              | Introduced revised information that is displayed for the following two versions of the show cable modem mac command: <ul style="list-style-type: none"> <li><b>show cable modem mac summary</b></li> </ul> Refer to “Usage Guidelines.” |

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | <p>This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes:</p> <ul style="list-style-type: none"> <li>• Support for the Cisco uBR7225VXR router was added.</li> <li>• Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>• The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> <li>• The following new initialization states were added to show initialization of CMs and CPEs supporting IPv6: <ul style="list-style-type: none"> <li>– init6(s)—CMTS router has seen SOLICIT message.</li> <li>– init6(a)—CMTS router has seen ADVERTISE message.</li> <li>– init6(r)—CMTS router has seen REQUEST message.</li> <li>– init6(i)—CMTS router has seen REPLY message.</li> <li>– init6(o)—CMTS router has seen version 6 TFTP request.</li> <li>– init6(t)—CMTS router has seen version 6 TOD request.</li> </ul> </li> </ul> |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Usage Guidelines

### Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.



#### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

Cisco IOS Release 12.3(17a)BC introduces changes for two versions of the **show cable modem mac** command.



- **show cable modem mac summary**

The information displayed with this command is revised. The DOCSIS 2.0 column in the Quality of Service (QoS) Provision Mode field has been removed, as this field is not applicable to QoS provisioning in DOCSIS 2.0.

### Command Output in Cisco IOS Release 12.3(17a)BC and Later Releases

```
Router# show cable modem mac summary
Cable Modem Summary

```

| Interface     | Total | Mac Version |        |        | QoS Provision Mode |        |        |
|---------------|-------|-------------|--------|--------|--------------------|--------|--------|
|               |       | DOC2.0      | DOC1.1 | DOC1.0 | Reg/Online         | DOC1.1 | DOC1.0 |
| Cable5/1/0/U0 | 10    | 0           | 2      | 8      | 10                 | 0      | 10     |

### Command Output in Cisco IOS Release 12.3(13a)BC and Earlier Releases

```
Router# scm mac sum
Cable Modem Summary

```

| Interface     | Total | Mac Version |        |        | QoS Provision Mode |        |        |        |
|---------------|-------|-------------|--------|--------|--------------------|--------|--------|--------|
|               |       | DOC2.0      | DOC1.1 | DOC1.0 | Reg/Online         | DOC2.0 | DOC1.1 | DOC1.0 |
| Cable8/0/0/U0 | 8     | 0           | 5      | 3      | 5                  | 0      | 5      | 0      |



#### Note

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

## Examples

This section contains examples for the different forms of the **show cable modem mac** command.

### Default Displays

The following example shows typical output for the default form of the **show cable modem mac** command:

```
Router# show cable modem mac
```

| MAC Address    | MAC State  | Prim Sid | Ver    | QoS Prov | Frag | Concat | PHS | Priv | DS    | US   |
|----------------|------------|----------|--------|----------|------|--------|-----|------|-------|------|
|                |            |          |        |          |      |        |     |      | Saids | Sids |
| 0050.7366.1243 | online     | 1        | DOC1.0 | DOC1.0   | no   | no     | no  | BPI  | 0     | 0    |
| 0002.b970.0027 | online     | 2        | DOC1.1 | DOC1.0   | no   | yes    | yes | BPI+ | 0     | 4    |
| 0006.5314.858d | online     | 3        | DOC1.1 | DOC1.1   | yes  | yes    | yes | BPI+ | 0     | 4    |
| 0010.64ff.e4ad | online     | 1        | DOC1.1 | DOC1.0   | yes  | yes    | yes | BPI+ | 0     | 4    |
| 0010.f025.1bd9 | init(rc)   | 2        | DOC1.0 | DOC1.0   | no   | no     | no  | BPI  | 0     | 0    |
| 0010.9659.4447 | online(pt) | 3        | DOC1.0 | DOC1.0   | no   | yes    | no  | BPI  | 0     | 0    |
| 0010.9659.4461 | online(pt) | 4        | DOC1.0 | DOC1.0   | no   | yes    | no  | BPI  | 0     | 0    |
| 0010.64ff.e459 | online     | 5        | DOC1.0 | DOC1.0   | no   | yes    | no  | BPI  | 0     | 0    |
| 0020.4089.7ed6 | online     | 6        | DOC1.0 | DOC1.0   | no   | no     | no  | BPI  | 0     | 0    |
| 0090.9607.3831 | online(pt) | 7        | DOC1.0 | DOC1.0   | no   | no     | no  | BPI  | 0     | 0    |
| 0090.9607.3830 | online(pt) | 1        | DOC1.0 | DOC1.0   | no   | no     | no  | BPI  | 0     | 0    |
| 0050.7366.12fb | init(i)    | 2        | DOC1.0 | DOC1.0   | no   | no     | no  | BPI  | 0     | 0    |
| 0010.fdfa.0a35 | online(pt) | 3        | DOC1.1 | DOC1.1   | yes  | yes    | yes | BPI+ | 0     | 4    |

**show cable modem mac**

The following example shows sample output for the **show cable modem mac** command for a particular cable interface:

```
Router# show cable modem c3/0 mac
```

| MAC Address    | MAC State | Prim Sid | Ver    | QoS Prov | Frag | Concat | PHS | Priv | DS | US |
|----------------|-----------|----------|--------|----------|------|--------|-----|------|----|----|
| 0050.7366.1243 | online    | 1        | DOC1.0 | DOC1.0   | no   | no     | no  | BPI  | 0  | 0  |
| 0002.b970.0027 | online    | 2        | DOC1.1 | DOC1.0   | no   | yes    | yes | BPI+ | 0  | 4  |
| 0006.5314.858d | online    | 3        | DOC1.1 | DOC1.1   | yes  | yes    | yes | BPI+ | 0  | 4  |

The following example shows sample output for the **show cable modem mac** command for a particular CM, as identified by its MAC address:

```
Router# show cable modem 0010.7bb3.fcd1 mac
```

| MAC Address    | MAC State | Prim Sid | Ver    | QoS Prov | Frag | Concat | PHS | Priv | DS | US |
|----------------|-----------|----------|--------|----------|------|--------|-----|------|----|----|
| 0010.7bb3.fcd1 | online    | 91       | DOC1.1 | DOC1.1   | yes  | yes    | yes | BPI+ | 1  | 4  |

The following example shows a sample output for the **show cable modem mac** command for a CM, as identified by its MAC address:

```
Router# show cable modem xxxx.xxxx.xxxx mac
```

| MAC Address    | IP Address | I/F       | MAC State | Prim Sid | RxPwr (dBmv) | Timing Offset | Num CPE | D |
|----------------|------------|-----------|-----------|----------|--------------|---------------|---------|---|
| xxxx.xxxx.xxxx | x.x.x.x    | C6/0/2/U0 | *online   | 3087     | 0.50         | 1037          | 0       | N |

**Note**

The \* in front of the MAC state indicates that the CM did not satisfy the bpi-plus-policy and the data traffic is blocked. The **cable privacy bpi-plus-policy** command enforces this requirement.

**Note**

The ! in front of the MAC state indicates that the CM has attempted to register with a modified cm configuration file. This is possibly a non-compliant CM trying to modify the service it is receiving.

The following example shows sample output for the **show cable modem mac** command for a particular CM, as identified by its IP address:

```
Router# show cable modem 10.1.1.10 mac
```

| MAC Address    | MAC State | Prim Sid | Ver    | QoS Prov | Frag | Concat | PHS | Priv | DS | US |
|----------------|-----------|----------|--------|----------|------|--------|-----|------|----|----|
| 0002.b970.0027 | online    | 2        | DOC1.1 | DOC1.0   | no   | yes    | yes | BPI+ | 0  | 4  |

[Table 108](#) describes the fields shown in the default forms of the **show cable modem mac** displays:

**Table 108** Descriptions for the Default show cable modem mac Fields

| Field       | Description                                                                                                 |
|-------------|-------------------------------------------------------------------------------------------------------------|
| MAC Address | The MAC address for the CM.                                                                                 |
| MAC State   | The current state of the MAC layer (see <a href="#">Table 107</a> ).                                        |
| Prim SID    | The primary SID assigned to this CM.                                                                        |
| Ver         | Displays the maximum supported version of DOCSIS that the CM supports (DOCSIS 1.0, DOCSIS 1.1, DOCSIS 2.0). |

**Table 108** Descriptions for the Default show cable modem mac Fields (continued)

| Field    | Description                                                                                                         |
|----------|---------------------------------------------------------------------------------------------------------------------|
| QoS Prov | Displays the version of DOCSIS that the CM currently is provisioned and registered for (DOCSIS 1.0 and DOCSIS 1.1). |
| Frag     | Indicates whether DOCSIS 1.1 or 2.0 MAC-layer fragmentation is enabled for this CM.                                 |
| Concat   | Indicates whether DOCSIS 1.1 or 2.0 MAC-layer concatenation is enabled for this CM.                                 |
| PHS      | Indicates whether DOCSIS 1.1 or 2.0 packet header suppression (PHS) is enabled for this CM.                         |
| Priv     | Indicates whether Baseline Privacy Interface (BPI) or BPI Plus (BPI+) encryption is enabled for the CM.             |
| DS Sids  | Number of downstream security association IDs (Sids) used by this CM.                                               |
| US Sids  | Number of upstream service IDs (SIDs) used by this CM.                                                              |

Table 107 shows the possible values for the MAC state field:

**Table 109** Descriptions for the MAC State Field <sup>1</sup>

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Registration and Provisioning Status Conditions for Devices Using IPv4 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| init(r1)                                                                                 | The CM sent initial ranging.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| init(r2)                                                                                 | The CM is ranging. The CMTS received initial ranging from the CM and has sent RF power, timing offset, and frequency adjustments to the CM.                                                                                                                                                                                                                                                                                                                                                                     |
| init(rc)                                                                                 | Ranging has completed.<br><br><b>Note</b> If a CM appears to be stuck in this state, it could be that the CM is able to communicate successfully on the cable network, but that the upstream is at capacity and does not have any additional bandwidth to allow the CM to finish registration and come online. Either manually move one or more CMs to other upstreams, or enable load balancing on the upstream using the <b>cable load-balance group</b> commands.                                            |
| init(d)                                                                                  | The DHCP request was received, as DHCPDISCOVER. This also indicates that the first IP broadcast packet has been received from the CM.                                                                                                                                                                                                                                                                                                                                                                           |
| init(dr)                                                                                 | The DHCP request has been sent to the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init(i)                                                                                  | The cable modem has received the DHCPOFFER reply (DHCPACK) from the DHCP server that has assigned an IP address to the modem, but the modem has not yet replied with a DHCPREQUEST message requesting that particular IP address, nor has it sent an IP packet with that IP address.<br><br><b>Note</b> If a CM appears to be stuck in this state, the CM has likely received the DHCPOFFER reply from the DHCP server, but this reply might have contained one or more invalid options for that particular CM. |
| init(io)                                                                                 | The Cisco CMTS has seen the DHCP offer as sent to the cable modem from the DHCP server that has assigned an IP address to the modem.                                                                                                                                                                                                                                                                                                                                                                            |

**Table 109** Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| init(o)                                                                                  | The CM has begun to download the option file (DOCSIS configuration file) using the Trivial File Transfer Protocol (TFTP), as specified in the DHCP response. If the CM remains in this state, it indicates that the download has failed.                                                                                                                                                                                                                                                                                                   |
| init(t)                                                                                  | Time-of-day (TOD) exchange has started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| resetting                                                                                | The CM is being reset and will shortly restart the registration process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Registration and Provisioning Status Conditions for Devices Using IPv6 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| init6(s)                                                                                 | The Cisco CMTS router has seen the DHCPv6 SOLICIT message from the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| init6(a)                                                                                 | The Cisco CMTS router has seen the ADVERTISE message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| init6(r)                                                                                 | The Cisco CMTS router has seen the REQUEST response from the CM to the DHCPv6 server.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| init6(i)                                                                                 | The Cisco CMTS router has seen the REPLY message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| init6(o)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TFTP server.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| init6(t)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TOD server.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Non-error Status Conditions</b>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| cc(r1)                                                                                   | The CM had registered and was online, but has received a Downstream Channel Change (DCC) or Upstream Channel Change (UCC) request message from the CMTS. The CM has begun moving to the new channel, and the CMTS has received the CM's initial ranging on the new downstream or upstream channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                        |
| cc(r2)                                                                                   | This state should normally follow cc(r1) and indicates that the CM has finished its initial ranging on the new channel, and is currently performing continuous ranging on the new channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                                                                                                                                |
| offline                                                                                  | The CM is considered offline (disconnected or powered down).                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| online                                                                                   | The CM has registered and is enabled to pass data on the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| online(d)                                                                                | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. The CM does not forward traffic to or from the CPE devices, but the CMTS can continue to communicate with the CM using DOCSIS messages and IP traffic (such as SNMP commands).</p> <p><b>Note</b> If BPI was enabled in the DOCSIS configuration file sent to the CM, assume that the CM is using BPI encryption, unless other messages show that the BPI negotiation and key assignments have failed.</p> |
| online(pkd)                                                                              | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and KEK is assigned.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pk) states.</p>                                                                                                                                                                                                                                                                   |

Table 109 Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value                                                                                                                                                                                                                                                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| online(ptd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pt) states.</p>                                                                                                                                                                                                                                                                                             |
| online(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| online(pt)                                                                                                                                                                                                                                                                                             | <p>The CM registered, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> If network access was disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) instead of online(pt) even when BPI encryption is enabled and operational.</p>                                                                                                                                                                                                                                   |
| <p><b>Note</b> If an exclamation point (!) appears in front of one of the online states, it indicates that the <b>cable dynamic-secret</b> command has been used with either the <b>mark</b> or <b>reject</b> option, and that the cable modem has failed the dynamic secret authentication check.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| expire(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| expire(pk d)                                                                                                                                                                                                                                                                                           | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pk) states.</p>                                                                                                                                                                                                                                                  |
| expire(pt)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| expire(pt d)                                                                                                                                                                                                                                                                                           | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pt) states.</p>                                                                                                                                                                                                                                                  |
| <b>Error Status Conditions</b>                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| reject(m)                                                                                                                                                                                                                                                                                              | <p>The CM attempted to register but registration was refused due to a bad Message Integrity Check (MIC) value. This also could indicate that the shared secret in the DOCSIS configuration file does not match the value configured on the CMTS with the <b>cable shared-secret</b> command.</p> <p>In Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases, this could also indicate that the <b>cable tftp-enforce</b> command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so.</p> |

**Table 109** Descriptions for the MAC State Field (continued)<sup>1</sup>

| MAC State Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| reject(c)       | <p>The CM attempted to register, but registration was refused due to a number of possible errors:</p> <ul style="list-style-type: none"> <li>• The CM attempted to register with a minimum guaranteed upstream bandwidth that would exceed the limits imposed by the <b>cable upstream admission-control</b> command.</li> <li>• The CM has been disabled because of a security violation.</li> <li>• A bad class of service (COS) value in the DOCSIS configuration file.</li> <li>• The CM attempted to create a new COS configuration but the CMTS is configured to not permit such changes.</li> <li>• The CM failed the timestamp check for its DOCSIS configuration file. (This could indicate a possible theft-of-service attempt, or a problem with the synchronization of the clocks on the CM and CMTS.)</li> </ul> |
| reject(pk)      | KEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(pkd)     | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pk) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| reject(pt)      | TEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(ptd)     | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>     | <p>In Cisco IOS Release 12.1(20)EC, Cisco IOS Release 12.2(15)BC1, and earlier releases, when network access is disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) even if BPI encryption fails. Use the <b>show cable modem mac-address</b> command to confirm whether BPI is enabled or disabled for a particular cable modem.</p>                                                                                                                                                                                                                                                                                                                                                                                            |
| reject(ts)      | The CM attempted to register, but registration failed because the TFTP server timestamp in the CM registration request did not match the timestamp maintained by the CMTS. This might indicate that the CM attempted to register by replaying an old DOCSIS configuration file used during a prior registration attempt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(ip)      | The CM attempted to register, but registration failed because the IP address in the CM request did not match the IP address that the TFTP server recorded when it sent the DOCSIS configuration file to the CM. IP spoofing could be occurring.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| reject(na)      | The CM attempted to register, but registration failed because the CM did not send a Registration-Acknowledgement (REG-ACK) message in reply to the Registration-Response (REG-RSP) message sent by the CMTS. A Registration-NonAcknowledgement (REG-NACK) is assumed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

1. The CM MAC state field can also be retrieved using SNMP by getting the value of the cdxCmtsCmStatusValue object in the CISCO-DOCS-EXT-MIB.

### Summary and Total Options

The following example shows the same display for the **show cable modem mac summary** command:

```
Router# show cable modem mac summary
```

```

 Cable Modem Summary

 Mac Version
Interface Total DOC2.0 DOC1.1 DOC1.0 Reg/Online QoS Provision Mode
 DOC2.0 DOC1.1 DOC1.0
Cable8/1/0/U1 1 1 0 0 1 0 0 1
Cable8/1/0/U4 2 2 0 2 2 1 1 0

```

```
Router#
```

The following example shows the summary display when the **total** option is added:

```
Router# show cable modem mac summary total
```

```

 Cable Modem Summary

 Mac Version
Interface Total DOC2.0 DOC1.1 DOC1.0 Reg/Online QoS Provision Mode
 DOC2.0 DOC1.1 DOC1.0
Cable5/1/0/U5 1 0 0 1 1 0 0 1
Cable6/1/0/U0 11 0 0 11 8 0 0 8
Cable6/1/1/U2 17 0 1 16 15 0 0 15
Cable7/0/0/U0 2 0 0 2 1 0 0 1
Cable7/0/0/U5 1 0 0 1 0 0 0 0

Total: 32 0 1 31 25 0 0 25

```

```
Router#
```

[Table 110](#) describes the fields shown in the **show cable modem mac summary** displays:

**Table 110** Descriptions for the show cable modem mac summary Fields

| Field                           | Description                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------|
| I/F                             | The cable interface line card providing the upstream for this CM.                                                    |
| Total                           | Total number of CMs currently active on this cable interface.                                                        |
| MAC Version<br>DOC 2.0          | Total number of CMs on this interface that reported in their registration request as having DOCSIS 2.0 capabilities. |
| MAC Version<br>DOC 1.1          | Total number of CMs on this interface that reported in their registration request as having DOCSIS 1.1 capabilities. |
| MAC Version<br>DOC 1.0          | Total number of CMs on this interface that reported in their registration request as having DOCSIS 1.0 capabilities. |
| Reg/Online                      | Total number of CMs on this interface that have completed registration and are currently online.                     |
| QoS Provisioned Mode<br>DOC 2.0 | Total number of CMs on this interface that have been provisioned and registered for DOCSIS 2.0 operations.           |
| QoS Provisioned Mode<br>DOC 1.1 | Total number of CMs on this interface that have been provisioned and registered for DOCSIS 1.1 operations.           |
| QoS Provisioned Mode<br>DOC 1.0 | Total number of CMs on this interface that have been provisioned and registered for DOCSIS 1.0 operations.           |

| Related Commands | Command                              | Description                                                                                        |
|------------------|--------------------------------------|----------------------------------------------------------------------------------------------------|
|                  | <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                   |
|                  | <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                      |
|                  | <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem. |
|                  | <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                              |
|                  | <b>show cable modem errors</b>       | Displays error statistics for one or more CMs.                                                     |
|                  | <b>show cable modem flap</b>         | Displays flap list statistics for one or more CMs.                                                 |
|                  | <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more CMs.                            |
|                  | <b>show cable modem phy</b>          | Displays the DOCSIS PHY layer information for one or more CMs.                                     |
|                  | <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                      |
|                  | <b>show interface cable sid</b>      | Displays cable interface information.                                                              |



# show cable modem maintenance

To display station maintenance (SM) error statistics for one or more cable modems, use the **show cable modem maintenance** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] maintenance
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
maintenance
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                           |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                                   |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

|                              |                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream</b> <i>port</i>  | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                  |
| <b>name</b> <i>fqdn</i>      | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |
| <b>maintenance</b>           | Displays station maintenance (SM) error statistics for one or more cable modems.                                                                                                                                                                                                                                                |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3XA      | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                 |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                           |
| 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                              |

**Usage Guidelines**

This command displays information about the number of times that a CM has exhausted its maximum retry attempts to respond to a Station Maintenance (SM) request, as well as the number of times that the CMTS has aborted ranging with a CM during a Station Maintenance interval. This information can be used to determine whether a particular cable modem or interface is experiencing plant or network difficulties.

You can display this information for all online cable modems, all online cable modems for a specific cable interface, or for one particular cable modem.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

### Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.



Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

### Examples

The following example shows sample output for the **show cable modem maintenance** command for all online cable modems:

```
Router# show cable modem maintenance
```

| MAC Address    | I/F       | Prim<br>Sid | SM Exhausted<br>Count Time | SM Aborted<br>Count Time |
|----------------|-----------|-------------|----------------------------|--------------------------|
| 0010.9507.01db | C5/1/0/U5 | 1           | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0002.b96f.fdbb | C6/1/0/U0 | 5           | 1 Jun 20 13:23:03          | 0 --- -- 00:00:00        |
| 0002.fdfa.129d | C6/1/0/U0 | 6           | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0002.fdfa.137d | C6/1/0/U0 | 7           | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0050.7302.3d73 | C6/1/0/U0 | 8           | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0002.fdfa.12d5 | C6/1/0/U0 | 9           | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0002.fdfa.1163 | C6/1/0/U0 | 10          | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0006.28f9.8bbd | C6/1/0/U0 | 11          | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 00d0.bad3.c0cf | C6/1/0/U0 | 12          | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0003.e38f.e85b | C6/1/0/U0 | 14          | 149 Jun 21 14:24:03        | 0 --- -- 00:00:00        |
| 0001.9659.519f | C6/1/0/U0 | 18          | 53 Jun 21 14:25:32         | 0 --- -- 00:00:00        |
| 0003.e3a6.8195 | C6/1/0/U0 | 19          | 10 Jun 21 05:37:54         | 0 --- -- 00:00:00        |
| 0003.e3a6.8173 | C6/1/1/U2 | 15          | 2 Jun 20 13:41:27          | 0 --- -- 00:00:00        |
| 0002.fdfa.12ef | C6/1/1/U2 | 16          | 1 Jun 20 13:16:30          | 0 --- -- 00:00:00        |
| 0002.fdfa.12e9 | C6/1/1/U2 | 17          | 1 Jun 20 13:16:30          | 0 --- -- 00:00:00        |
| 0003.e3a6.7f69 | C6/1/1/U2 | 18          | 2 Jun 20 13:43:10          | 0 --- -- 00:00:00        |
| 0030.80bc.3095 | C6/1/1/U2 | 19          | 2 Jun 20 13:45:00          | 0 --- -- 00:00:00        |
| 0003.e38f.e9ab | C6/1/1/U2 | 20          | 1 Jun 20 13:43:47          | 0 --- -- 00:00:00        |
| 0006.28f9.9d19 | C6/1/1/U2 | 22          | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0003.e3a6.7fe3 | C6/1/1/U2 | 23          | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0020.4005.3f06 | C6/1/1/U2 | 24          | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |

```
Router#
```

**show cable modem maintenance**

The following example shows sample output for the **show cable modem maintenance** command for all cable modems on a specific cable interface:

```
Router# show cable modem c8/1/0 maintenance
```

| MAC Address    | I/F       | Prim<br>Sid | SM Exhausted<br>Count Time | SM Aborted<br>Count Time |
|----------------|-----------|-------------|----------------------------|--------------------------|
| 0050.7366.1243 | C8/1/0/U1 | 1           | 1 Apr 28 13:06:11          | 0 --- -- 00:00:00        |
| 0002.b970.0027 | C8/1/0/U4 | 2           | 0 --- -- 00:00:00          | 0 --- -- 00:00:00        |
| 0006.5314.858d | C8/1/0/U4 | 3           | 2 Apr 28 13:07:28          | 0 --- -- 00:00:00        |

```
Router#
```

The following example shows sample output for the **show cable modem maintenance** command for a particular CM:

```
Router# show cable modem 0010.7bb3.fcd1 maintenance
```

| MAC Address    | I/F     | Prim<br>Sid | SM Exhausted<br>Count Time | SM Aborted<br>Count Time |
|----------------|---------|-------------|----------------------------|--------------------------|
| 0010.7bb3.fcd1 | C5/0/U5 | 1           | 3 Jun 1 10:24:52           | 0 Jan 1 00:00:00         |

```
Router#
```

[Table 111](#) describes the fields shown in the **show cable modem maintenance** displays:

**Table 111** Descriptions for the show cable modem maintenance Fields

| Field              | Description                                                                                                                                                                                                                                    |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address        | The MAC address for the CM.                                                                                                                                                                                                                    |
| I/F                | The cable interface line card, including upstream, for this CM.                                                                                                                                                                                |
| Prim SID           | The primary SID assigned to this CM.                                                                                                                                                                                                           |
| SM Exhausted Count | Number of times this CM has repeatedly timed out and exhausted the maximum allowable retry attempts when it was sent a Station Maintenance request. The CMTS responds by taking the CM offline, forcing the CM to reinitialize and reregister. |
| SM Exhausted Time  | The last time that this CM repeatedly timed out and exhausted the maximum allowable retry attempts when it was sent a Station Maintenance request.                                                                                             |
| SM Aborted Count   | Number of times the CMTS has aborted ranging for a CM during a Station Maintenance period, typically because the CM has been reset.                                                                                                            |
| SM Aborted Time    | The last time the CMTS aborted ranging for a CM during a Station Maintenance period, typically because the CM has been reset.                                                                                                                  |

**Related Commands**

| Command                               | Description                                                                                                       |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable flap-list miss-threshold</b> | Configures the threshold for recording a flap-list event, in terms of missed Station Maintenance messages.        |
| <b>cable modem vendor</b>             | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                  |
| <b>show cable modem</b>               | Displays information for the registered and unregistered CMs.                                                     |
| <b>show cable modem calls</b>         | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |

| Command                              | Description                                                                                                                    |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                             |
| <b>show cable modem domain-name</b>  | Updates the cable-specific DNS cache and display the domain name for specified CMs and CPE behind a CM on a Cisco CMTS router. |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                                                                    |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                                           |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                                                                 |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                                                  |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                                          |

# show cable modem offline

To display a list of the cable modems (CMs) that are marked as offline with the Cisco CMTS router, use the **show cable modem offline** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] offline
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
offline
```

### Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                       |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                               |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

|                              |                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream</b> <i>port</i>  | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                  |
| <b>name</b> <i>fqdn</i>      | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |
| <b>offline</b>               | Displays a list of the cable modems that are marked as offline.                                                                                                                                                                                                                                                                 |

**Defaults**

Displays a list of all offline CMs known by the Cisco CMTS router.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release                  | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(7)XR and 12.1(1a)T1 | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 12.2(4)BC1               | Support for the Cisco uBR10012 router was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 12.2(33)SCA              | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> <li>The following new initialization states were added to show initialization of CMs and CPEs supporting IPv6: <ul style="list-style-type: none"> <li>init6(s)—CMTS router has seen SOLICIT message.</li> <li>init6(a)—CMTS router has seen ADVERTISE message.</li> <li>init6(r)—CMTS router has seen REQUEST message.</li> <li>init6(i)—CMTS router has seen REPLY message.</li> <li>init6(o)—CMTS router has seen version 6 TFTP request.</li> <li>init6(t)—CMTS router has seen version 6 TOD request.</li> </ul> </li> </ul> |
| 12.2(33)SCE              | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 12.2(33)SCF              | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Usage Guidelines**

This command displays a list of CMs that had either been online previously or had attempted to register with the CMTS, but that are now considered offline. Offline cable modems remain in the CMTS databases for 24 hours and then are deleted.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration**

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Examples**

The following example shows sample output for the default form of the **show cable modem offline** command.

```
Router# show cable modem offline
```

| Interface   | MAC address    | Prim<br>Sid | Previous<br>State | Offline<br>Time | Rx<br>Power | Rx<br>SNR | SM<br>Exhaust<br>Count |
|-------------|----------------|-------------|-------------------|-----------------|-------------|-----------|------------------------|
| Cable5/0/U0 | 0030.946a.5d61 | 1           | init(i)           | Jun 14 21:31:57 | 0.00        | 31.86     | 162                    |
| Cable5/0/U0 | 0030.946a.5d85 | 2           | init(i)           | Jun 14 22:47:39 | -0.25       | 31.26     | 156                    |
| Cable5/0/U0 | 0030.946a.5b6d | 3           | init(i)           | Jun 14 14:20:11 | 1.00        | 30.56     | 166                    |

The following example shows sample output for the **show cable modem offline** command for a particular upstream on a cable interface:

```
Router# show cable modem c3/0 upstream 0 offline
```

| Interface | MAC address    | Prim<br>Sid | Previous<br>State | Offline<br>Time | Rx<br>Power | Rx<br>SNR | SM<br>Exhaust<br>Count |
|-----------|----------------|-------------|-------------------|-----------------|-------------|-----------|------------------------|
| C3/0/U0   | 0050.7366.1c69 | 58          | init(rc)          | Jan 7 16:46:49  | 4.50        | 26.72     | 2                      |
| C3/0/U0   | 0050.7366.1c53 | 59          | init(rc)          | Jan 7 16:47:09  | 5.25        | 25.10     | 1                      |
| C3/0/U0   | 0050.7366.1ca7 | 60          | init(rc)          | Jan 7 16:47:11  | 5.00        | 25.57     | 1                      |



```

C3/0/U0 0050.7366.1c45 61 init(rc) Jan 7 16:49:27 5.00 26.74 2
C3/0/U0 0050.7366.1c95 62 init(rc) Jan 7 16:51:29 5.50 31.82 1
C3/0/U0 0050.7366.1c99 64 init(rc) Jan 7 16:52:55 5.25 26.76 2

```

The following example shows sample output for the **show cable modem offline** command for a single CM, as identified by its IP address:

```
Router# show cable modem 22.1.1.10 offline
```

```

Interface MAC address Prim Previous Offline Rx Rx SM
 Sid State Time Power SNR Exhaust
 Count
Cable5/0/U0 0030.946a.5b6d 3 init(i) Jun 14 14:20:11 1.00 30.56 166

```

The following example shows sample output for the **show cable modem offline** command for a single CM, as identified by its MAC address:

```
Router# show cable modem 0030.946a.5d61 offline
```

```

Interface MAC address Prim Previous Offline Rx Rx SM
 Sid State Time Power SNR Exhaust
 Count
Cable5/0/U0 0030.946a.5d61 1 init(i) Jun 14 21:31:57 0.00 31.86 162

```

[Table 112](#) describes the major fields shown in the **show cable modem offline** displays:

**Table 112** Descriptions for the show cable modem offline Fields

| Field            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface        | The cable interface line card that this CM last used when it was online.                                                                                                                                                                                                                                                                                                                                                                                                 |
| MAC address      | Hardware MAC address for this CM.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Prim SID         | The primary SID that had been last assigned to this CM before it went offline.                                                                                                                                                                                                                                                                                                                                                                                           |
| Previous State   | The last known state of the MAC layer for this CM before it went offline (see <a href="#">Table 107</a> ).<br><br><b>Note</b> A pound sign (#) in the Previous State column indicates that the <b>cable tftp-enforce mark-only</b> command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so (Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases). |
| Offline Time     | The time and date that this CM last went offline.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Rx Power         | The last known received power level (in dB) for the CM before it went offline.<br><br><b>Note</b> An asterisk (*) in the Rx Power column indicates that a power adjustment was made for that CM. An exclamation point (!) indicates that the CM had reached its maximum power transmit level and could not increase its power level further.                                                                                                                             |
| Rx SNR           | The last known signal-to-noise ratio (SNR) value for this CM before it went offline.                                                                                                                                                                                                                                                                                                                                                                                     |
| SM Exhaust Count | Number of times that this CM has exhausted the maximum allowable retries for not responding to the regular Station Maintenance (SM) messages sent to it by the CMTS.                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>      | Using the <b>clear counters</b> command to reset a cable interface's counters also resets the SM Exhaust Count field for all offline CMs to zero and resets the Offline Time field for all offline CMs to the current time.                                                                                                                                                                                                                                              |

Table 107 shows the possible values for the Previous State field:

**Table 113** Descriptions for the Previous State Field <sup>1</sup>

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Registration and Provisioning Status Conditions for Devices Using IPv4 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| init(r1)                                                                                 | The CM sent initial ranging.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| init(r2)                                                                                 | The CM is ranging. The CMTS received initial ranging from the CM and has sent RF power, timing offset, and frequency adjustments to the CM.                                                                                                                                                                                                                                                                                                                                                                     |
| init(rc)                                                                                 | Ranging has completed.<br><br><b>Note</b> If a CM appears to be stuck in this state, it could be that the CM is able to communicate successfully on the cable network, but that the upstream is at capacity and does not have any additional bandwidth to allow the CM to finish registration and come online. Either manually move one or more CMs to other upstreams, or enable load balancing on the upstream using the <b>cable load-balance group</b> commands.                                            |
| init(d)                                                                                  | The DHCP request was received, as DHCPDISCOVER. This also indicates that the first IP broadcast packet has been received from the CM.                                                                                                                                                                                                                                                                                                                                                                           |
| init(dr)                                                                                 | The DHCP request has been sent to the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init(i)                                                                                  | The cable modem has received the DHCPOFFER reply (DHCPACK) from the DHCP server that has assigned an IP address to the modem, but the modem has not yet replied with a DHCPREQUEST message requesting that particular IP address, nor has it sent an IP packet with that IP address.<br><br><b>Note</b> If a CM appears to be stuck in this state, the CM has likely received the DHCPOFFER reply from the DHCP server, but this reply might have contained one or more invalid options for that particular CM. |
| init(io)                                                                                 | The Cisco CMTS has seen the DHCP offer as sent to the cable modem from the DHCP server that has assigned an IP address to the modem.                                                                                                                                                                                                                                                                                                                                                                            |
| init(o)                                                                                  | The CM has begun to download the option file (DOCSIS configuration file) using the Trivial File Transfer Protocol (TFTP), as specified in the DHCP response. If the CM remains in this state, it indicates that the download has failed.                                                                                                                                                                                                                                                                        |
| init(t)                                                                                  | Time-of-day (TOD) exchange has started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| resetting                                                                                | The CM is being reset and will shortly restart the registration process.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Registration and Provisioning Status Conditions for Devices Using IPv6 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| init6(s)                                                                                 | The Cisco CMTS router has seen the DHCPv6 SOLICIT message from the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| init6(a)                                                                                 | The Cisco CMTS router has seen the ADVERTISE message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| init6(r)                                                                                 | The Cisco CMTS router has seen the REQUEST response from the CM to the DHCPv6 server.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| init6(i)                                                                                 | The Cisco CMTS router has seen the REPLY message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init6(o)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TFTP server.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init6(t)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TOD server.                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Table 113** Descriptions for the Previous State Field (continued)<sup>1</sup>

| MAC State Value                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Non-error Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| cc(r1)                             | The CM had registered and was online, but has received a Downstream Channel Change (DCC) or Upstream Channel Change (UCC) request message from the CMTS. The CM has begun moving to the new channel, and the CMTS has received the CM's initial ranging on the new downstream or upstream channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                        |
| cc(r2)                             | This state should normally follow cc(r1) and indicates that the CM has finished its initial ranging on the new channel, and is currently performing continuous ranging on the new channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                                                                                                                                |
| offline                            | The CM is considered offline (disconnected or powered down).                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| online                             | The CM has registered and is enabled to pass data on the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| online(d)                          | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. The CM does not forward traffic to or from the CPE devices, but the CMTS can continue to communicate with the CM using DOCSIS messages and IP traffic (such as SNMP commands).</p> <p><b>Note</b> If BPI was enabled in the DOCSIS configuration file sent to the CM, assume that the CM is using BPI encryption, unless other messages show that the BPI negotiation and key assignments have failed.</p> |
| online(pkd)                        | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and KEK is assigned.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pk) states.</p>                                                                                                                                                                                                                                                                   |
| online(ptd)                        | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pt) states.</p>                                                                                                                                                                                                                            |
| online(pk)                         | The CM registered, BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| online(pt)                         | <p>The CM registered, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> If network access was disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) instead of online(pt) even when BPI encryption is enabled and operational.</p>                                                                                                                                                                  |
| <b>Note</b>                        | If an exclamation point (!) appears in front of one of the online states, it indicates that the <b>cable dynamic-secret</b> command has been used with either the <b>mark</b> or <b>reject</b> option, and that the cable modem has failed the dynamic secret authentication check.                                                                                                                                                                                                                                                        |
| expire(pk)                         | The CM registered, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 113** Descriptions for the Previous State Field (continued)<sup>1</sup>

| MAC State Value                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| expire(pk)                     | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pk) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| expire(pt)                     | <p>The CM registered, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| expire(pte)                    | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Error Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| reject(m)                      | <p>The CM attempted to register but registration was refused due to a bad Message Integrity Check (MIC) value. This also could indicate that the shared secret in the DOCSIS configuration file does not match the value configured on the CMTS with the <b>cable shared-secret</b> command.</p> <p>In Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases, this could also indicate that the <b>cable tftp-enforce</b> command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so.</p>                                                                                                                                                                                                                   |
| reject(c)                      | <p>The CM attempted to register, but registration was refused due to a number of possible errors:</p> <ul style="list-style-type: none"> <li>• The CM attempted to register with a minimum guaranteed upstream bandwidth that would exceed the limits imposed by the <b>cable upstream admission-control</b> command.</li> <li>• The CM has been disabled because of a security violation.</li> <li>• A bad class of service (COS) value in the DOCSIS configuration file.</li> <li>• The CM attempted to create a new COS configuration but the CMTS is configured to not permit such changes.</li> <li>• The CM failed the timestamp check for its DOCSIS configuration file. (This could indicate a possible theft-of-service attempt, or a problem with the synchronization of the clocks on the CM and CMTS.)</li> </ul> |
| reject(pk)                     | <p>KEK key assignment is rejected, BPI encryption has not been established.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| reject(pke)                    | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pk) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| reject(pt)                     | <p>TEK key assignment is rejected, BPI encryption has not been established.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| reject(pte)                    | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Table 113 Descriptions for the Previous State Field (continued)<sup>1</sup>

| MAC State Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b>     | In Cisco IOS Release 12.1(20)EC, Cisco IOS Release 12.2(15)BC1, and earlier releases, when network access is disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) even if BPI encryption fails. Use the <b>show cable modem mac-address</b> command to confirm whether BPI is enabled or disabled for a particular cable modem. |
| reject(ts)      | The CM attempted to register, but registration failed because the TFTP server timestamp in the CM registration request did not match the timestamp maintained by the CMTS. This might indicate that the CM attempted to register by replaying an old DOCSIS configuration file used during a prior registration attempt.                                                                                                    |
| reject(ip)      | The CM attempted to register, but registration failed because the IP address in the CM request did not match the IP address that the TFTP server recorded when it sent the DOCSIS configuration file to the CM. IP spoofing could be occurring.                                                                                                                                                                             |
| reject(na)      | The CM attempted to register, but registration failed because the CM did not send a Registration-Acknowledgement (REG-ACK) message in reply to the Registration-Response (REG-RSP) message sent by the CMTS. A Registration-NonAcknowledgement (REG-NACK) is assumed.                                                                                                                                                       |

1. The CM MAC state field can also be retrieved using SNMP by getting the value of the cdxCmtsCmStatusValue object in the CISCO-DOCS-EXT-MIB.

## Related Commands

| Command                              | Description                                                                                             |
|--------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                        |
| <b>clear counters</b>                | Clears counters for one or all interfaces.                                                              |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                           |
| <b>show cable modem access-group</b> | Displays the access groups for the CMs on a particular cable interface.                                 |
| <b>show cable modem classifiers</b>  | Displays information about the classifiers for a particular CM.                                         |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                                   |
| <b>show cable modem cpe</b>          | Displays the CPE devices accessing the cable interface through a particular CM.                         |
| <b>show cable modem registered</b>   | Displays a list of the CMs that are marked as registered with the Cisco CMTS.                           |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                    |
| <b>show cable modem unregistered</b> | Displays a list of the CMs that are marked as unregistered with the Cisco CMTS.                         |
| <b>show cable modem vendor</b>       | Displays the vendor name or Organizational Unique Identifier (OUI) for the CMs on each cable interface. |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                           |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                   |

# show cable modem partial-mode

To display information about cable modems that are in upstream and downstream partial service mode, use the **show cable modem partial-mode** command in privileged EXEC mode.

**show cable modem partial-mode**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.2(33)SCD2 | This command was introduced. |

**Usage Guidelines** If all cable modems are in full service mode (all downstream and upstream channels of the cable modems are online and operational), then the **show cable modem partial-mode** command does not provide any output. This command provides output only when the cable modems register in partial service mode (one or more downstream or upstream channels of the downstream or upstream bonded cable modems are not operational).

**Examples** The following is a sample output of the **show cable modem partial-mode** command that displays all the cable modems in partial service mode:

```
Router# show cable modem partial-mode
```

| MAC Address    | IP Address | I/F       | MAC State    | Prim Sid | RCC ID | UP-reason/<br>Failed-tcs |
|----------------|------------|-----------|--------------|----------|--------|--------------------------|
| 001e.6bfb.33a0 | 2.99.81.14 | C7/0/0/p  | p-online(pt) | 3        | 2      | 0x1 / 0x4                |
| 0022.cef4.3d9a | 2.99.81.23 | C7/0/0/p  | p-online(pt) | 4        | 2      | 0x1 / 0x4                |
| 001e.6bfb.194e | 2.99.81.32 | C7/0/0/p  | p-online(pt) | 6        | 2      | 0x1 / 0x4                |
| 001e.6bfb.1538 | 2.99.81.38 | C7/0/0/p  | p-online(pt) | 8        | 2      | 0x1 / 0x4                |
| 001e.6bfb.0d22 | 2.99.81.29 | C7/0/0/p  | p-online(pt) | 9        | 1      | 0x1 / 0x4                |
| 001e.6bfb.1a7e | 2.99.81.30 | C7/0/0/p  | p-online(pt) | 10       | 1      | 0x1 / 0x4                |
| 001e.6bfa.f58a | 2.99.81.9  | C7/0/0/p  | p-online(pt) | 12       | 1      | 0x1 / 0x4                |
| 0022.cef4.3fa2 | 2.99.81.24 | C7/0/0/p  | p-online(pt) | 13       | 2      | 0x1 / 0x4                |
| 001e.6bfb.1b72 | 2.99.81.10 | C7/0/0/p  | p-online(pt) | 14       | 2      | 0x1 / 0x4                |
| 0023.be50.e578 | 2.99.81.17 | C7/0/0/UB | p-online(pt) | 16       | 2      | N/A                      |
| 0025.2e2d.784a | 2.99.81.28 | C7/0/0/UB | p-online(pt) | 17       | 2      | N/A                      |
| 0025.2e2d.748c | 2.99.81.26 | C7/0/0/UB | p-online(pt) | 18       | 2      | N/A                      |

Table 114 describes the significant fields shown in the display.

**Table 114** show cable modem partial-mode Field Descriptions

| Field       | Description                                                      |
|-------------|------------------------------------------------------------------|
| MAC Address | MAC address of the cable modem.                                  |
| IP Address  | IP address that the DHCP server has assigned to the cable modem. |

**Table 114** *show cable modem partial-mode Field Descriptions (continued)*

| Field                | Description                                                                                                                                                                                                                                  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/F                  | Cable interface line card providing the upstream for the cable modem.                                                                                                                                                                        |
| MAC State            | Current state of the MAC layer.                                                                                                                                                                                                              |
| Prim Sid             | Primary Service ID (SID) assigned to the cable modem.                                                                                                                                                                                        |
| RCC ID               | Receive channel configuration (RCC) ID of the cable modem.                                                                                                                                                                                   |
| UP-reason/Failed-tcs | <ul style="list-style-type: none"><li>UP-reason—Upstream partial service reason. This is a bitmap defined in upstream resiliency.</li><li>Failed-tcs—Transmit channel set (TCS) bitmap of the cable modem, which is not available.</li></ul> |

**Related Commands**

| Command                                | Description                                                                                    |
|----------------------------------------|------------------------------------------------------------------------------------------------|
| <b>show cable modem</b>                | Displays information about the registered and unregistered cable modems.                       |
| <b>show cable modem docsis-version</b> | Displays information about the DOCSIS version of cable modems on one or more cable interfaces. |

# show cable modem partial-service

To display the impaired state of the cable modems on the Cisco CMTS router, use the **show cable modem partial-service** command in privileged EXEC mode.

**show cable modem partial-service**

**Syntax Description**      This command has no arguments or keywords.

**Command Modes**          Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

**Examples**                    The following is a sample output of the **show cable modem partial-service** command:

Router# **show cable modem partial-service**

| MAC Address    | IP Address | I/F      | MAC State    | DSxUS State | Impaired DS | Impaired US |
|----------------|------------|----------|--------------|-------------|-------------|-------------|
| 54d4.6ffb.2f6b | 40.4.58.16 | C7/0/0/p | w-online(pt) | 3x3         |             | 1           |
| 54d4.6ffb.30fd | 40.4.58.14 | C7/0/0/p | w-online(pt) | 3x3         |             | 1           |
| 4458.2945.2ade | 40.4.58.18 | C7/0/0/p | w-online(pt) | 3x3         |             | 1           |
| 001e.6bfc.d1ea | 40.4.58.26 | C7/0/0/p | w-online     | 3x3         |             | 1           |
| 54d4.6ffb.2e21 | 40.4.58.5  | C7/0/0/p | w-online(pt) | 3x3         |             | 1           |
| 54d4.6ffb.2e1b | 40.4.58.23 | C7/0/0/p | w-online(pt) | 3x3         |             | 1           |
| 4458.2945.2a78 | 40.4.58.21 | C7/0/0/p | w-online(pt) | 3x3         |             | 1           |
| 4458.2945.4604 | 40.4.58.19 | C7/0/0/p | w-online(pt) | 3x3         |             | 1           |
| 54d4.6ffb.2e66 | ---        | C8/0/0/p | w-online(pt) | 3x3         |             | 1           |

Table 89 describes the significant fields shown in the display:

**Table 115            show cable modem partial-service Field Descriptions**

| Field       | Description                                                       |
|-------------|-------------------------------------------------------------------|
| MAC Address | MAC address of the cable modem.                                   |
| IP Address  | IP address of the cable modem.                                    |
| I/F         | Interface on the cable modem.                                     |
| MAC State   | State of the cable modem.                                         |
| DSxUS State | State of the downstream and upstream channels on the cable modem. |
| Impaired DS | Name of the impaired downstream RF channel.                       |
| Impaired US | Port number of the impaired upstream RF channel.                  |



| Related Commands | Command                           | Description                                                                            |
|------------------|-----------------------------------|----------------------------------------------------------------------------------------|
|                  | <b>show cable modem</b>           | Displays information for the registered and unregistered cable modems.                 |
|                  | <b>show interface cable modem</b> | Displays information about the cable modems connected to a particular cable interface. |

# show cable modem phy

To display DOCSIS PHY layer information for one or more cable modems (CMs), use the **show cable modem phy** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] phy
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn] phy
```

### Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                           |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                                   |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <i>upstream port</i>         | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card.                                                                                                                                                               |

|                              |                                                                                                                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                      |
| <b>name</b> <i>fqdn</i>      | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |
| <b>phy</b>                   | Displays DOCSIS PHY layer information for one or more cable modems.                                                                                                                                                                                                 |

**Defaults**

Displays PHY information for all CMs.

**Command Modes**

Privileged EXEC (#)

**Command History**

This table includes the following release-specific history entries:

- [CX and BC Releases](#)
- [SC Release](#)

| <b>CX and BC Releases</b> | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX and 12.2(4)BC1  | This command was introduced for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers.                                                                                                                                                                                                                                                                                        |
| 12.2(15)BC2               | The service ID (SID) and Mode fields were added to the default display.                                                                                                                                                                                                                                                                                                                            |
| 12.3(17a)BC               | Enhanced the <b>show cable modem phy</b> command. The MicroReflec column (MicroReflections) has been removed, and the DOCSIS Prov (DOCSIS Provider) column has been added in its place. This new column contains DOCSIS version information. See updated examples.                                                                                                                                 |
| <b>SC Release</b>         | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                                |
| 12.2(33)SCA               | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>• Support for the Cisco uBR7225VXR router was added.</li> <li>• Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>• The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |
| 12.2(33)SCC               | For DOCSIS 3.0-certified cable modems with multiple upstream channels, the command output was modified to display PHY layer details of each upstream channel. In this case, the output may contain multiple results for the same MAC address. The asterix (*) that appears beside the DOCSIS operating mode under the Mode column identifies that the CM is operating in the MTC mode.             |
| 12.2(33)SCE               | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                                 |
| 12.2(33)SCF               | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                                    |

**Usage Guidelines**

This command displays information about the DOCSIS PHY layer for one or more CMs. You can display information for all CMs, for all CMs on a particular cable interface, or for a particular CM, as identified by its IP or MAC address.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration**

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Examples****Example from Cisco IOS Release 12.3(17a)BC and Later Releases**

Cisco IOS Release 12.3(17a)BC introduces revised output for the **show cable modem phy** command. The MicroReflec column (MicroReflections) has been removed, and the DOCSIS Prov (DOCSIS Provider) column has been added in its place. This new column contains DOCSIS version information.

```
Router# show cable modem phy
```

| MAC Address    | I/F       | Sid | USPwr<br>(dBmV) | USSNR<br>(dB) | Timing<br>Offset | DSPwr<br>(dBmV) | DSSNR<br>(dB) | Mode | DOCSIS<br>Prov |
|----------------|-----------|-----|-----------------|---------------|------------------|-----------------|---------------|------|----------------|
| 0003.e350.9a3f | C5/1/0/U0 | 1   | 0.00            | 30.23         | 2811             | 0.00            | -----         | tdma | 1.0            |
| 0050.734e.c1a1 | C5/1/0/U0 | 2   | 0.00            | 30.47         | 2811             | 0.00            | -----         | tdma | 1.0            |
| 0007.0e01.1749 | C5/1/0/U0 | 3   | 0.00            | 30.65         | 2808             | 0.00            | -----         | tdma | 1.0            |
| 0007.0e00.90dd | C5/1/0/U0 | 4   | 0.00            | 30.66         | 2806             | 0.00            | -----         | tdma | 1.0            |
| 0003.e350.9ad3 | C5/1/0/U0 | 5   | 0.00            | 30.47         | 2810             | 0.00            | -----         | tdma | 1.0            |
| 0003.e38f.f4e5 | C5/1/0/U0 | 6   | 0.00            | 30.36         | 2813             | 0.00            | -----         | tdma | 1.0            |
| 0003.e350.9b97 | C5/1/0/U0 | 7   | 0.00            | 30.44         | 2812             | 0.00            | -----         | tdma | 1.0            |
| 0003.e350.9bed | C5/1/0/U0 | 8   | 0.00            | 30.16         | 2814             | 0.00            | -----         | tdma | 1.0            |
| 0003.e308.455d | C5/1/0/U0 | 9   | 0.00            | 30.79         | 2811             | 0.00            | -----         | tdma | 1.0            |
| 0003.6bd6.bfaf | C5/1/0/U0 | 10  | 0.00            | 30.40         | 2813             | 0.00            | -----         | tdma | 1.0            |

**Examples from Cisco IOS Release 12.3(13a)BC and Earlier Releases**Router# **show cable modem phy**

| MAC Address    | I/F       | Sid | USPwr<br>(dBmV) | USSNR<br>(dB) | Timing<br>Offset | MicroReflec<br>(dBc) | DSPwr<br>(dBmV) | DSSNR<br>(dB) | Mode |
|----------------|-----------|-----|-----------------|---------------|------------------|----------------------|-----------------|---------------|------|
| 0008.0e06.7b14 | C8/0/0/U0 | 1   | 0.00            | 30.36         | 1938             | 0                    | 0.00            | -----         | tdma |
| 0050.f112.5977 | C8/0/0/U0 | 2   | 0.00            | 30.36         | 1695             | 0                    | 0.00            | -----         | tdma |
| 0090.837b.b0b9 | C8/0/0/U0 | 3   | 0.00            | 30.64         | 1187             | 0                    | 0.00            | -----         | tdma |
| 0007.0e03.6e99 | C8/0/0/U0 | 5   | 0.00            | 30.36         | 2747             | 0                    | 0.00            | -----         | tdma |
| 0007.0e04.5091 | C8/0/0/U0 | 6   | 0.00            | 30.94         | 2746             | 0                    | 0.00            | -----         | tdma |
| 0006.5314.81d9 | C8/0/0/U0 | 7   | 0.00            | 30.36         | 2745             | 0                    | 0.00            | -----         | tdma |
| 0003.6b1b.ee63 | C8/0/0/U0 | 8   | 0.00            | 31.26         | 2745             | 0                    | 0.00            | -----         | tdma |
| 0030.eb15.84e7 | C8/0/0/U0 | 12  | 0.00            | 30.36         | 1157             | 0                    | 0.00            | -----         | tdma |

The following example shows sample output for the **show cable modem phy** command for all CMs on the Cisco CMTS router:

Router# **show cable modem phy**

| MAC Address    | I/F  | Sid | USPwr<br>(dBmV) | USSNR<br>(dBmV) | Timing<br>Offset | MicroReflec<br>(dBc) | DSPwr<br>(dBmV) | DSSNR<br>(dBmV) | Mode |
|----------------|------|-----|-----------------|-----------------|------------------|----------------------|-----------------|-----------------|------|
| 0008.0e09.81f8 | C3/0 | 1   | 50.00           | 28.40           | 1705             | 26                   | -3.4            | 36.02           | tdma |
| 0003.6b3c.1aa7 | C3/0 | 2   | 0.00            | 28.27           | 3643             | 0                    | 0.00            | -----           | tdma |
| 0008.0e09.7fe2 | C4/0 | 3   | 35.00           | 28.44           | 1760             | 27                   | 12.00           | 35.03           | tdma |

The following example shows sample output for the **show cable modem phy** command for all CMs on a particular cable interface:

Router# **show cable modem cable 3/0 phy**

| MAC Address    | I/F  | Sid | USPwr<br>(dBmV) | USSNR<br>(dBmV) | Timing<br>Offset | MicroReflec<br>(dBc) | DSPwr<br>(dBmV) | DSSNR<br>(dBmV) | Mode |
|----------------|------|-----|-----------------|-----------------|------------------|----------------------|-----------------|-----------------|------|
| 0008.0e09.81f8 | C3/0 | 1   | 50.00           | 28.40           | 1705             | 26                   | -3.4            | 36.02           | tdma |
| 0003.6b3c.1aa7 | C3/0 | 2   | 0.00            | 28.27           | 3643             | 0                    | 0.00            | -----           | tdma |

The following example shows sample output for the **show cable modem phy** command for a particular CM:

Router# **show cable modem 0050.7366.1243 phy**

| MAC Address    | I/F  | Sid | USPwr<br>(dBmV) | USSNR<br>(dBmV) | Timing<br>Offset | MicroReflec<br>(dBc) | DSPwr<br>(dBmV) | DSSNR<br>(dBmV) | Mode |
|----------------|------|-----|-----------------|-----------------|------------------|----------------------|-----------------|-----------------|------|
| 0050.6736.4124 | C3/0 | 14  | 38.00           | 24.58           | 1651             | 0                    | 8.00            | 35.41           | tdma |

**Example from Cisco IOS Release 12.2(33)SCD**

The following example shows a sample output of the **show cable modem phy** command for all CMs on the Cisco CMTS router:

Router# **show cable modem phy**

| MAC Address    | I/F       | Sid | USPwr<br>(dBmV) | USMER<br>(SNR)<br>(dB) | Timing<br>Offset | DSPwr<br>(dBmV) | DSMER<br>(SNR)<br>(dB) | Mode  | DOCSIS<br>Prov |
|----------------|-----------|-----|-----------------|------------------------|------------------|-----------------|------------------------|-------|----------------|
| 001c.ea37.9b5c | C3/0/U2.0 | 27  | 0.00            | 36.12                  | 5394             | 0.00            | -----                  | tdma  | 1.1            |
| 001c.ea37.9b78 | C3/0/U2.0 | 29  | 0.00            | 36.12                  | 5396             | 0.00            | -----                  | tdma  | 1.1            |
| 001c.ea37.9b5a | C3/0/U3.0 | 31  | 0.00            | 36.12                  | 5394             | 0.00            | -----                  | tdma  | 1.1            |
| 001c.ea37.9ba4 | C3/0/U2.0 | 32  | 0.00            | 36.12                  | 5393             | 0.00            | -----                  | tdma  | 1.1            |
| 001c.ea37.9aac | C3/1/U2.1 | 28  | 0.00            | 36.12                  | 5620             | 0.00            | -----                  | tdma  | 1.1            |
| 001a.c3ff.d1a4 | C3/1/U0.0 | 29  | 43.50           | 36.12                  | 6020             | 0.00            | -----                  | tdma* | 1.1            |
| 001a.c3ff.d1a4 | C3/1/U1.0 | 29  | 43.50           | 36.12                  | 6020             | 0.00            | -----                  | tdma* | 1.1            |
| 001a.c3ff.d1a4 | C3/1/U2.0 | 29  | 43.50           | 36.12                  | 6019             | 0.00            | -----                  | tdma* | 1.1            |
| 001a.c3ff.d1a4 | C3/1/U3.0 | 29  | 43.50           | 36.12                  | 6021             | 0.00            | -----                  | tdma* | 1.1            |

Table 116 describes the fields shown in the **show cable modem phy** displays:

**Table 116** Descriptions for the show cable modem phy Fields

| Field             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address       | The MAC address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| I/F               | The cable interface on the CMTS that is providing services for this CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| SID               | Service ID that this CM is using.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| USPwr (dBmV)      | Displays the CM transmit level in dBmV, as measured by the CMTS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| USSNR (dBmV)      | <p>Upstream signal-to-noise ratio (SNR) or carrier-to-noise ratio (CNR), in dB, as measured by the CMTS. This field shows the CNR value for cable interfaces that support onboard hardware-based spectrum management, such as the Cisco uBR-MC16S card, and shows the SNR value for other cable interfaces.</p> <p><b>Note</b> Although the field name shows the value as being given in dBmV, the actual value should be interpreted in dB.</p>                                                                                                                                                                                                                                                                                                                                                                                                           |
| Timing Offset     | <p>The timing offset for the CM, in ticks, as recognized on the CMTS. (A tick, as used here, is 6.25/64 microseconds.) This is the delay between when a particular cable modem is scheduled to make a transmission and when the CMTS actually receives it.</p> <p><b>Note</b> An exclamation point (!) in the Timing Offset column indicates that the CM has exceeded the maximum delay and timing offset specified by the <b>cable map-advance</b> command.</p> <p><b>Note</b> The timing offset shown here is typically smaller than the TX Time Offset value shown by the <b>show cable modem remote-query</b> command, because the latter value is the offset as recognized on the CM (which will include any internal delay between when the CM software begins the transmission and when the bits actually appear on the local cable interface).</p> |
| Microreflec (dBc) | <p>The approximate value of microreflections on the downstream, measured in dBc below the signal level, as seen by the CM. Microreflections are a type of impairment that is caused by impedance mismatches between amplifiers, couples, cables, and other equipment in the cable plant. Microreflections create copies of a signal that arrive at the receiver with different amounts of delay and attenuation, generating intersymbol interference (ISI) that can cause the receiver to improperly detect the amplitude and phase of the incoming signal.</p> <p><b>Note</b> This value is not exact but provides an approximate indication of the microreflections that have been received.</p>                                                                                                                                                         |
| DSPwr (dBmV)      | Downstream receive power level, in dBmV, as reported by the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| DSSNR (dBmV)      | Downstream signal-to-noise ratio (SNR), in dB, as reported by the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Table 116** Descriptions for the show cable modem phy Fields (continued)

| Field       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | This command displays values for the downstream power and SNR values only if you have configured the <b>cable modem remote-query</b> command on the CMTS, and if the CM supports providing those options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Mode        | <p>DOCSIS operating mode for the CM:</p> <ul style="list-style-type: none"> <li>• tdma=DOCSIS 1.X, TDMA-only mode</li> <li>• atdma=DOCSIS 2.0 A-TDMA mode</li> </ul> <p>A hyphen (-) indicates the mode is unknown or the CM has not yet registered.</p> <p>For DOCSIS 3.0-certified cable modems with multiple upstream channels, the output may contain multiple results for the same MAC address. In Cisco IOS Release 12.2(33)SCC, the asterisk (*) that appears beside the DOCSIS operating mode under the Mode column identifies that the CM is operating in the MTC mode.</p> <p><b>Note</b> This field is the same as that returned by the docsIfCmtsCmStatusModulationType object in the DOCS-IF-MIB.</p> |

**Related Commands**

| Command                              | Description                                                                                        |
|--------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>cable modem remote-query</b>      | Enables and configures the remote-query feature to gather CM performance statistics on the CMTS.   |
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                   |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                      |
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem. |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                              |
| <b>show cable modem cpe</b>          | Displays the CPE devices accessing the cable interface through a particular CM.                    |
| <b>show cable modem errors</b>       | Displays error statistics for one or more CMs.                                                     |
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more cable modems.                                        |
| <b>show cable modem mac</b>          | Displays MAC layer information for one or more CMs.                                                |

| Command                              | Description                                                                      |
|--------------------------------------|----------------------------------------------------------------------------------|
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems. |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                      |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                             |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.    |
| <b>show interface cable sid</b>      | Displays cable interface information.                                            |



# show cable modem primary-channel

To display the primary-channel and host interface for all modems or for modems on a MAC domain host interface, use the **show cable modem primary-channel** command.

```
show cable modem [cable {slot/subslot/port | slot/subslot/cable-interface-index} [upstream port
[logical-channel-index]]] primary-channel [non-bonding-capable [legacy-ranging]]
[wideband [registered-traditional-docsis]]
```

| Syntax Description                   |                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                          | Slot where the line card resides. The valid range is from 5 to 8.                                                                                                                                                                                                                                                                                                                                  |
| <i>subslot</i>                       | Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                             |
| <i>port</i>                          | Downstream port number. The valid range is from 0 to 4 (depending on the cable interface).                                                                                                                                                                                                                                                                                                         |
| <i>cable-interface-index</i>         | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <b>upstream</b> <i>port</i>          | (Optional) Displays information for all CMs using this specific upstream. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports on the cable interface line card.                                                                                   |
| <i>logical-channel-index</i>         | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                                                                                     |
| <b>non-bonding-capable</b>           | Displays the cable modems and primary downstreams of the cable modems that are not capable of bonding.                                                                                                                                                                                                                                                                                             |
| <b>legacy-initial-ranging</b>        | Displays modems that access with legacy INIT-RNG-REQ.                                                                                                                                                                                                                                                                                                                                              |
| <b>wideband</b>                      | Displays wideband online modems.                                                                                                                                                                                                                                                                                                                                                                   |
| <b>registered-traditional-docsis</b> | Displays wideband cable modems registered in traditional pre-DOCSIS3.0 mode.                                                                                                                                                                                                                                                                                                                       |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC (#)

## ■ show cable modem primary-channel

## Command History

| Release     | Modification                                                                                       |
|-------------|----------------------------------------------------------------------------------------------------|
| 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.                                         |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> . |
| 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                    |

## Usage Guidelines

Use this command to display the primary downstream channel information of modems for different modem categories in terms of bonding capability, such as, non-bonding-capable modems accessed with legacy initial ranging or wideband cable modems registered via traditional DOCSIS.

## Examples

The following **show cable modem primary-channel non-bonding-capable** command shows the individual cable modems displays and the primary downstream channel for each cable modem.

```
Router# show cable modem primary-channel non-bonding-capable
```

| MAC Address    | IP Address | Host      | MAC        | Prim | Num | Primary    | DS   |
|----------------|------------|-----------|------------|------|-----|------------|------|
|                |            | Interface | State      | Sid  | CPE | Downstream | RfId |
| 000f.66f9.aa73 | 80.17.1.3  | C6/0/0/U0 | online(pt) | 1    | 0   | C6/0/0     | 255  |
| 0007.0e02.d7e9 | 80.17.1.7  | C6/0/0/U0 | online(pt) | 5    | 0   | Mo3/0/0:1  | 1    |
| 0013.10bb.22f9 | 80.17.1.2  | C6/0/0/U0 | online(pt) | 2    | 0   | Mo3/0/0:1  | 1    |
| 000f.66f9.b193 | 80.17.1.6  | C6/0/0/U0 | online(pt) | 22   | 0   | C6/0/0     | 255  |
| 0012.17ea.f3fb | 80.17.1.4  | C6/0/0/U0 | online(pt) | 23   | 0   | C6/0/0     | 255  |
| 0013.10bb.23d1 | 80.17.1.5  | C6/0/1/U1 | online(pt) | 5    | 0   | C6/0/1     | 255  |

## Related Commands

| Command                                         | Description                                                               |
|-------------------------------------------------|---------------------------------------------------------------------------|
| <b>show cable modem</b>                         | Displays information for the registered and unregistered CMs.             |
| <b>show cable modem voice</b>                   | Displays detected voice-enabled modems.                                   |
| <b>show cable service-voice downstream type</b> | Shows the current enforced downstream type on the uBR10-MC5x20 line card. |
| <b>show cable modem rf-adapt</b>                | Displays RF adaptation information for cable modems.                      |

# show cable modem primary-channel summary total

To display the number of cable modems grouped by primary downstream channels information under a Channel Grouping Domain (CGD), use the **show cable modem primary-channel summary total** command in privileged EXEC mode.

**show cable modem primary-channel** [*cable slot/subslot/port*] **summary total**

|                           |                |                                                                                        |
|---------------------------|----------------|----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>slot</i>    | The slot used for the cable interface line card. Valid values are 5 to 8.              |
|                           | <i>subslot</i> | The subslot used for the cable interface line card. Valid values are 0 to 1.           |
|                           | <i>port</i>    | The downstream port used as a MAC domain host interface port. Valid values are 0 to 4. |

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

|                        |                |                                                            |
|------------------------|----------------|------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                        |
|                        | 12.3(23)BC     | This command was introduced for the Cisco uBR10012 router. |

**Usage Guidelines**

Use the **show cable modem primary-channel summary total** command to display the number of cable modems grouped by primary downstream channels. You can also use this command to display information for narrowband and wideband modems and group the information based on a SPA or a uBR10-MC 5x20 primary downstream. You can also display information on modems based on a specific cable MAC domain.

**Examples**

The following example shows attributes of the primary channels to which the various modems are hosted under the CGD domain c6/0/0.

```
Router#show cable modem primary-channel
MAC Address IP Address Host MAC Prim Num Primary DS
 IP Address Interface State Sid CPE Downstream RfId
000f.66f9.aa73 80.17.1.2 C6/0/0/U0 online 13 0 C6/0/0 255
000f.66f9.b193 80.17.1.3 C6/0/0/U0 online 14 0 C6/0/0 255
0012.17ea.f3fb 80.17.1.5 C6/0/0/U0 online 15 0 C6/0/0 255
0019.474a.d4f8 80.17.1.13 C6/0/0/U0 online 16 0 C6/0/0 255
0000.cab7.7f1c 80.17.1.8 C6/0/0/U0 online 17 1 C6/0/0 255
0019.474a.d3d4 80.17.1.11 C6/0/0/U0 online 18 0 C6/0/0 255
0007.0e02.d7e9 80.17.1.10 C6/0/0/U0 online 19 0 C6/0/0 255
0019.474a.cd82 80.17.1.20 C6/0/0/U0 online 20 0 C6/0/0 255
0019.474a.d3fa 80.17.1.7 C6/0/0/U0 online 22 0 C6/0/0 255
0018.6852.82ea 80.17.1.6 C6/0/0/U0 online 24 0 C6/0/0 255
0013.10bb.23d1 80.17.1.12 C6/0/0/U0 online 23 1 Mo3/0/0:0 0
```

The following example shows modems grouped according to their capability, indicating whether they are wideband or narrowband modems. The command also displays the local of the primary downstreams of the modem, indicating whether the primary downstream is a SPA downstream (Remote) or a uBR10-MC 5x20 downstream (Local). The Wideband column indicates if the status of the modem is online or wideband-online.

**show cable modem primary-channel summary total**Router#**show cable modem primary-channel summary total**

|                            | Total | Reg | Oper | Unreg | Offline | Wideband | initRC | initD | initIO | initO | 0-Blaze |
|----------------------------|-------|-----|------|-------|---------|----------|--------|-------|--------|-------|---------|
| Cable Modem                |       |     |      |       |         |          |        |       |        |       |         |
| Local Primary Narrowband:  |       |     |      |       |         |          |        |       |        |       |         |
| C6/0/0                     | 5     | 5   | 5    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| C6/0/1                     | 0     | 0   | 0    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Subtotal:                  | 5     | 5   | 5    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Local Primary Wideband:    |       |     |      |       |         |          |        |       |        |       |         |
| C6/0/0                     | 5     | 5   | 5    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| C6/0/1                     | 0     | 0   | 0    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Subtotal:                  | 5     | 5   | 5    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Remote Primary Narrowband: |       |     |      |       |         |          |        |       |        |       |         |
| Mo3/0/0:0                  | 1     | 1   | 1    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Subtotal:                  | 1     | 1   | 1    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Remote Primary Wideband:   |       |     |      |       |         |          |        |       |        |       |         |
| Subtotal:                  | 0     | 0   | 0    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Total:                     | 11    | 11  | 11   | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |

The example below shows the modems grouped by primary downstream channels for the cable MAC domain c6/0/0.

Router#**show cable modem primary-channel summary c6/0/0 total**

|                            | Total | Reg | Oper | Unreg | Offline | Wideband | initRC | initD | initIO | initO | 0-Blaze |
|----------------------------|-------|-----|------|-------|---------|----------|--------|-------|--------|-------|---------|
| Cable Modem                |       |     |      |       |         |          |        |       |        |       |         |
| Local Primary Narrowband:  |       |     |      |       |         |          |        |       |        |       |         |
| C6/0/0                     | 5     | 5   | 5    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Local Primary Wideband:    |       |     |      |       |         |          |        |       |        |       |         |
| C6/0/0                     | 5     | 5   | 5    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Remote Primary Narrowband: |       |     |      |       |         |          |        |       |        |       |         |
| Mo3/0/0:0                  | 1     | 1   | 1    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Subtotal:                  | 1     | 1   | 1    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Remote Primary Wideband:   |       |     |      |       |         |          |        |       |        |       |         |
| Subtotal:                  | 0     | 0   | 0    | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |
| Total:                     | 11    | 11  | 11   | 0     | 0       | 0        | 0      | 0     | 0      | 0     | 0       |

**Related Commands**

| Command                 | Description                                                            |
|-------------------------|------------------------------------------------------------------------|
| <b>show cable modem</b> | Displays information for the registered and unregistered cable modems. |

# show cable modem privacy

To display the privacy information for the registered and unregistered CMs, use the **show cable modem privacy** command in privileged EXEC mode.

## Cisco uBR7200 Series Routers

```
show cable modem {ip-address | mac-address} privacy [verbose]
```

## Cisco uBR10012 Router

```
show cable modem {ip-address | mac-address} privacy [verbose]
```

|                    |                    |                                                                                                                                                          |
|--------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>ip-address</i>  | IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed. |
|                    | <i>mac-address</i> | MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.         |
|                    | <b>privacy</b>     | Displays the privacy information for the CMs.                                                                                                            |
|                    | <b>verbose</b>     | Displays detailed information for the CMs.                                                                                                               |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

|                  |                                                                                                            |
|------------------|------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command displays privacy information of a particular CM, identified by its IP address or MAC address. |
|------------------|------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following sample output from the <b>show cable modem privacy</b> command shows the privacy information for a particular CM using a specified MAC address. |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show cable modem 0018.6835.2987 privacy

MAC Address : 0018.6835.2987
Primary SID : 10
BPI Mode : BPI+
BPI State : assign(tek)
Security Capabilities :
 Encryption : DES-56
 EAE : Unsupported
Latest Key Sequence : 2
Key Status : Active
Remaining Lifetime : 294 sec
Key Gracetime : 60 sec
Current Key Sequence : 2
CA Certificate Details :
 Certificate Serial : 57BF2DF60E9FFBECF8E69709DE34BC26
```

## ■ show cable modem privacy

```

Certificate Self-Signed : False
Certificate State : Chained
CM Certificate Details :
 CM Certificate Serial : 010244AF1A135202
 CM Certificate State : Chained
KEK Reject Code : None
KEK Reject Reason : No Information
KEK Invalid Code : None
KEK Invalid Reason : No Information

Primary SID Information :
SID : 10
Encryption Algorithm : 56-bit DES
Latest Sequence Number : 5
 Key Status : Active
 Remaining Lifetime : 144 sec
 Key Gracetime : 60 sec
Current Sequence Number : 4
 Key Status : Active
 Remaining Lifetime : 54 sec
 Key Gracetime : 60 sec
TEK Reject Code : None
TEK Reject Reason : No Information
TEK Invalid Code : None
TEK Invalid Reason : No Information

```

**Example of show cable modem privacy verbose Command Output for a Specified MAC Address**

The following example shows sample output for the **verbose** option for a particular CM:

```

Router# show cable modem 0018.6835.2987 privacy verbose
MAC Address : 0018.6835.2987
Primary SID : 10
BPI Mode : BPI+
BPI State : assign(tek)
Security Capabilities :
 Encryption : DES-56
 EAE : Unsupported
Latest Key Sequence : 2
 Key Status : Active
 Remaining Lifetime : 256 sec
 Key Gracetime : 60 sec
Authorization Key : 2004065504831967119C16051FD722C5209E165F
Key Encryption Key : F14EFC15118B6B06
Upstream HMAC Key : 150E3F56451F6E033DEB79BCF819A9D8EAF6B95D
Downstream HMAC Key : 9AA3EC8869D64927560589692CCE4C21F3DA9029
Current Key Sequence : 2
Authorization Counters :
 Authorization Infos : 4
 Authorization Requests : 2
 Authorization Replies : 2
 Authorization Rejects : 0
 Authorization Invalids : 0
Traffic Key Counters :
 Traffic Key Requests : 4
 Traffic Key Replies : 4
 Traffic Key Rejects : 0
 Traffic Key Invalids : 0
Certificate Counters :
 Untrusted Manufacturer : 0
 Untrusted CM Certificate : 0
 Issuer Not Found : 0
 Invalid Signature : 0

```

```

Expired Certificate : 0
Certificate Not Activated: 0
Certificate in Hotlist : 0
Public Key Mismatch : 0
Invalid MAC : 0
Invalid CM Certificate : 0
CA Certificate Details :
 Certificate Serial : 57BF2DF60E9FFBECF8E69709DE34BC26
 Certificate Self-Signed : False
 Certificate State : Chained
CM Certificate Details :
 CM Certificate Serial : 010244AF1A135202
 CM Certificate State : Chained
KEK Reject Code : None
KEK Reject Reason : No Information
KEK Invalid Code : None
KEK Invalid Reason : No Information

Primary SID Information :
SID : 10
Encryption Algorithm : 56-bit DES
Latest Sequence Number : 5
 Key Status : Active
 Remaining Lifetime : 106 sec
 Key Gracetime : 60 sec
 Hardware Keys Match : True
 DES Key : 156819BF016E139B
 DES IV : 07291CAE15AD0845
Current Sequence Number : 4
 Key Status : Active
 Remaining Lifetime : 16 sec
 Key Gracetime : 60 sec
 Hardware Keys Match : True
 DES Key : 23EF1C9801F40EE3
 DES IV : 163D19831AFB25DC
TEK Requests : 4
TEK Replies : 4
TEK Rejects : 0
TEK Invalids : 0
TEK Receive Errors : 0
TEK Reject Code : None
TEK Reject Reason : No Information
TEK Invalid Code : None
TEK Invalid Reason : No Information

```

Table 117 describes the major fields shown in the **show cable modem privacy** command display:

**Table 117** *show cable modem privacy Field Descriptions*

| Field                 | Description                                                                                                 |
|-----------------------|-------------------------------------------------------------------------------------------------------------|
| MAC Address           | MAC address for the CM.                                                                                     |
| Prim SID              | Primary SID assigned to the CM.                                                                             |
| BPI Mode              | Baseline Privacy Interface (BPI) mode used.                                                                 |
| BPI State             | Displays the BPI state.                                                                                     |
| Security Capabilities | Security capabilities of the modem like encryption algorithm and Early Authentication and Encryption (EAE). |
| Encryption            | Encryption method used.                                                                                     |

**Table 117** *show cable modem privacy Field Descriptions (continued)*

| Field                     | Description                                               |
|---------------------------|-----------------------------------------------------------|
| EAE                       | EAE support.                                              |
| Latest Key Sequence       | Latest key sequence number.                               |
| Key Status                | Status of the key; whether active or not.                 |
| Remaining Lifetime        | Remaining lifetime of the key in seconds.                 |
| Key Gracetime             | Grace time available for the key in seconds.              |
| Authorization Key         | Authorization key code.                                   |
| Key Encryption Key        | Key used to encrypt the traffic key.                      |
| Upstream HMAC Key         | Upstream Hashed Message Authentication Code (HMAC) key.   |
| Downstream HMAC Key       | Downstream Hashed Message Authentication Code (HMAC) key. |
| Current Key Sequence      | Current key sequence number.                              |
| Authorization Counters    | Authorization counter information.                        |
| Authorization Infos       | Authorization information.                                |
| Authorization Requests    | Number of authorized requests.                            |
| Authorization Replies     | Number of authorized replies.                             |
| Authorization Rejects     | Rejected authorization.                                   |
| Authorization Invalids    | Invalid authorization.                                    |
| Traffic Key Counters      | Traffic key counter information.                          |
| Traffic Key Requests      | Number of traffic key requests.                           |
| Traffic Key Replies       | Number of traffic key replies.                            |
| Traffic Key Rejects       | Number of traffic key rejects.                            |
| Traffic Key Invalids      | Number of invalid traffic keys.                           |
| Certificate Counters      | Certificate counter information.                          |
| Untrusted Manufacturer    | Count of untrusted manufacturers.                         |
| Untrusted CM Certificate  | Count of untrusted CM certificates.                       |
| Issuer Not Found          | Count of certificate issuers not found in the database.   |
| Invalid Signature         | Count of invalid signatures.                              |
| Expired Certificate       | Number of expired certificates.                           |
| Certificate Not Activated | Count of certificates not activated.                      |
| Certificate in Hotlist    | Number of certificates in hotlist.                        |
| Public Key Mismatch       | Number of public key mismatch.                            |
| Invalid MAC               | Number of invalid MACs.                                   |
| Invalid CM Certificate    | Number of invalid CM certificates.                        |
| CA Certificate Details    | CA certificate information.                               |
| Certificate Serial        | CA certificate serial number.                             |
| Certificate Self-Signed   | Self-signed CA certificate.                               |



**Table 117** *show cable modem privacy Field Descriptions (continued)*

| Field                   | Description                                                 |
|-------------------------|-------------------------------------------------------------|
| Certificate State       | Current state of the CA certificate.                        |
| CM Certificate Details  | CM certificate information.                                 |
| CM Certificate Serial   | CM certificate serial number.                               |
| CM Certificate State    | Current state of the CM certificate.                        |
| KEK Reject Code         | Key Encryption Key (KEK) reject code.                       |
| KEK Reject Reason       | KEK reject reason.                                          |
| KEK Invalid Code        | KEK invalid code.                                           |
| KEK Invalid Reason      | Reason for the invalid KEK.                                 |
| Primary SID Information | Primary SID assigned to this CM.                            |
| SID                     | SID used by the CM.                                         |
| Encryption Algorithm    | Encryption algorithm used.                                  |
| Latest Sequence Number  | Latest sequence number.                                     |
| Current Sequence Number | Current sequence number.                                    |
| Hardware Keys Match     | Hardware key match.                                         |
| DES Key                 | Data Encryption Standard (DES) key number.                  |
| DES IV                  | Initialization vector. This can be AES or DES.              |
| TEK Requests            | Displays the number of Traffic Exchange Key (TEK) requests. |
| TEK Replies             | Number of TEK requests.                                     |
| TEK Rejects             | Number of TEK rejects.                                      |
| TEK Invalids            | Number of invalid TEKs.                                     |
| TEK Receive Errors      | Number of TEK receive errors.                               |
| TEK Reject Code         | TEK reject code.                                            |
| TEK Reject Reason       | TEK reject reason.                                          |
| TEK Invalid Code        | TEK invalid code.                                           |
| TEK Invalid Reason      | TEK invalid reason.                                         |

**Related Commands**

| Command                   | Description                                                  |
|---------------------------|--------------------------------------------------------------|
| <b>cable privacy</b>      | Enables and configures BPI+ encryption on a cable interface. |
| <b>cable privacy kek</b>  | Sets KEK and timeout periods.                                |
| <b>cable privacy tek</b>  | Sets TEK and timeout periods.                                |
| <b>show cable privacy</b> | Displays information about BPI status and operation.         |

# show cable modem qos

To display the quality of service (QoS) and service flow information for a particular cable modem (CM), use the **show cable modem qos** command in privileged EXEC mode.

```
show cable modem {ip-address | mac-address | name fqdn} qos [service-class | verbose]
```

## Syntax Description

|                      |                                                                                                                                                                                                                                                                     |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>    | IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                            |
| <i>mac-address</i>   | MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                    |
| <b>name fqdn</b>     | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router. |
| <b>service-class</b> | (Optional) Displays the service class names associated with each service flow for a specific cable modem.                                                                                                                                                           |
| <b>verbose</b>       | (Optional) Displays detailed information for each service flow ID (SFID) for the CM.                                                                                                                                                                                |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3XA      | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                 |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |
| 12.2(33)SCC | The command output was modified to display the traffic peak rate value for a specific service flow.                                                                                                                                                                                                                                                                                          |
| 12.2(33)SCF | This command was modified. The <b>service-class</b> keyword was added to display the service class names for each service flow for a specific cable modem.                                                                                                                                                                                                                                   |
| 12.2(33)SCG | The command output was modified to display the scheduling type as “N/A” for all downstream service flows.                                                                                                                                                                                                                                                                                    |

**Usage Guidelines**

This command displays the service flows currently in use by a CM. The default form of the display shows one service flow per line, while the **verbose** form displays complete information for each flow.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration**

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Note**

Starting with Cisco IOS Release 12.2(33)SCG, the output of the **show cable modem qos** command displays the scheduling type of all downstream service flows (DS-SF) as “N/A” to indicate that the DS-SFs do not have any scheduling type.

**Examples****Example of the show cable modem qos Command for a Cable Modem Specified by MAC Address**

The following example is a sample output of the **show cable modem qos** command for a specific CM identified by its MAC address:

```
Router# show cable modem 0010.7bb3.fcd1 qos
```

| Sfid | Dir | Curr<br>State | Sid | Sched<br>Type | Prio | MaxSusRate | MaxBrst | MinRsvRate | Throughput |
|------|-----|---------------|-----|---------------|------|------------|---------|------------|------------|
| 3    | US  | act           | 1   | BE            | 7    | 2000000    | 1522    | 100000     | 0          |
| 4    | DS  | act           | N/A | BE            | 0    | 4000000    | 1522    | 0          | 0          |

**Example of the show cable modem qos Command for a Cable Modem Specified by IP Address**

The following example is a sample output of the **show cable modem qos** command for a specific CM identified by its IP address:

## ■ show cable modem qos

```
Router# show cable modem 22.1.1.10 qos
```

| Sfid | Dir | Curr State | Sid | Sched Type | Prio | MaxSusRate | MaxBrst | MinRsvRate | Throughput |
|------|-----|------------|-----|------------|------|------------|---------|------------|------------|
| 7    | US  | act        | 3   | BE         | 0    | 0          | 3044    | 0          | 0          |
| 9    | US  | act        | 4   | BE         | 0    | 1000000    | 65224   | 0          | 0          |
| 10   | US  | act        | 5   | BE         | 0    | 1000000    | 65224   | 0          | 0          |
| 8    | DS  | act        | N/A | BE         | 0    | 0          | 3044    | 0          | 0          |

**Example of the show cable modem qos verbose Command for a Cable Modem Specified by IP Address**

The following example is a sample output for the **verbose** form of the **show cable modem qos** command for a specific CM identified by its IP address:

```
Router# show cable modem 22.1.1.10 qos verbose
```

```
Sfid : 7
Current State : Active
Sid : 3
Traffic Priority : 0
Maximum Sustained rate : 0 bits/sec
Maximum Burst : 3044 bytes
Minimum Reserved rate : 0 bits/sec
Minimum Packet Size : 64 bytes
Admitted QoS Timeout : 200 seconds
Active QoS Timeout : 0 seconds
Maximum Concatenated Burst : 1522 bytes
Scheduling Type : Best Effort
Request/Transmission policy : 0x0
IP ToS Overwrite[AND-mask, OR-mask] : 0xFF, 0x0
Current Throughput : 0 bits/sec, 0 packets/sec
```

```
Sfid : 9
Current State : Active
Sid : 4
Traffic Priority : 0
Maximum Sustained rate : 1000000 bits/sec
Maximum Burst : 65224 bytes
Minimum Reserved rate : 0 bits/sec
Minimum Packet Size : 64 bytes
Admitted QoS Timeout : 0 seconds
Active QoS Timeout : 0 seconds
Maximum Concatenated Burst : 1522 bytes
Scheduling Type : Best Effort
Request/Transmission policy : 0x0
IP ToS Overwrite[AND-mask, OR-mask] : 0xFF, 0x0
Current Throughput : 0 bits/sec, 0 packets/sec
```

```
Sfid : 10
Current State : Active
Sid : 5
Traffic Priority : 0
Maximum Sustained rate : 1000000 bits/sec
Maximum Burst : 65224 bytes
Minimum Reserved rate : 0 bits/sec
Minimum Packet Size : 64 bytes
Admitted QoS Timeout : 0 seconds
Active QoS Timeout : 0 seconds
Maximum Concatenated Burst : 1522 bytes
Scheduling Type : Best Effort
Request/Transmission policy : 0x0
```

```

IP ToS Overwrite[AND-mask, OR-mask] : 0xFF, 0x0
Current Throughput : 0 bits/sec, 0 packets/sec

```

```

Sfid : 8
Current State : Active
Sid : N/A
Traffic Priority : 0
Maximum Sustained rate : 0 bits/sec
Maximum Burst : 3044 bytes
Minimum Reserved rate : 0 bits/sec
Minimum Packet Size : 64 bytes
Admitted QoS Timeout : 200 seconds
Active QoS Timeout : 0 seconds
Maximum Latency : 0 usecs
Current Throughput : 0 bits/sec, 0 packets/sec

```

The following example is a sample output for the **verbose** form of the **show cable modem qos** command indicating the traffic peak rate value for a specific service flow.

```
Router# show cable modem 22.1.1.10 qos verbose
```

```

Sfid : 40
Current State : Active
Sid : 35
Traffic Priority : 4
Maximum Sustained rate : 20000000 bits/sec
Maximum Burst : 20000000 bytes
Minimum Reserved rate : 0 bits/sec
Minimum Packet Size : 0 bytes
Admitted QoS Timeout : 200 seconds
Active QoS Timeout : 0 seconds
Maximum Concatenated Burst : 65535 bytes
Scheduling Type : Best Effort
Request/Transmission policy : 0x0
IP ToS Overwrite[AND-mask, OR-mask] : 0xFF, 0x0
Peak Rate : 50000000 bits/sec
Current Throughput : 0 bits/sec, 0 packets/sec

```

#### Example of the show cable modem qos service-class Command for a Cable Modem in Cisco IOS Release 12.2(33)SCF

The following example is a sample output of the **service-class** option of the **show cable modem qos** command for a specific CM identified by its IP address:

```
Router# show cable modem 22.1.1.10 qos service-class
```

| Sfid | Dir | Sched<br>Type | MaxSusRate | MaxBrst | MinRsvRate | SrvClassName    |
|------|-----|---------------|------------|---------|------------|-----------------|
| 33   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts1 |
| 35   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts2 |
| 34   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts1 |
| 36   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts2 |

Table 118 describes the major fields shown in the **show cable modem qos** displays:

**Table 118** Descriptions for the show cable modem qos Fields

| Field                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sfid                 | Identifies the Service Flow ID (SFID) for this service flow.                                                                                                                                                                                                                                                                                                                                                                                                               |
| Dir                  | Identifies whether the service flow applies to the downstream (DS) or upstream (US) direction.                                                                                                                                                                                                                                                                                                                                                                             |
| Curr State           | Current State—Identifies the current state of the service flow: Active or Inactive.                                                                                                                                                                                                                                                                                                                                                                                        |
| Sid                  | Identifies the Service ID (SID) associated with this SFID.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Sched Type           | Identifies this service flow's scheduling type: <ul style="list-style-type: none"> <li>• BE—Best-Effort</li> <li>• NRTPS—Non-Real-Time Polling Service</li> <li>• N/A—Scheduling type is not applicable to a service flow.</li> <li>• RTPS—Real-Time Polling Service</li> <li>• RSVD—Reserved but not yet in use</li> <li>• UGS_AD—Unsolicited Grant Service with Activity Detection</li> <li>• UGS—Unsolicited Grant Service</li> <li>• UNDEF—Not yet defined.</li> </ul> |
| Prio                 | Traffic priority (0 to 7) given to this service flow.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| MaxSusRate           | Maximum sustained rate value, in bits per second.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| MaxBrst              | Maximum burst value, in bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| MinRsvRate           | Minimum reserved rate, in bits per second.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Throughput           | Current Throughput for this service flow, in packets per second.                                                                                                                                                                                                                                                                                                                                                                                                           |
| SrvClassName         | Service class name associated with this service flow.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Minimum Packet Size  | Assumed minimum reserved rate packet size on this service flow, in bytes.                                                                                                                                                                                                                                                                                                                                                                                                  |
| Admitted QoS Timeout | Timeout for admitted QoS parameters, in seconds, which specifies the length of time that the CMTS must reserve resources for a service flow's admitted Qos parameter set, when they exceed the resources allowed by the active QoS parameter set.                                                                                                                                                                                                                          |
| Active QoS Timeout   | Timeout for active Qos parameters, in seconds, which specifies the maximum amount of time that resources can remained unused on an active service flow.                                                                                                                                                                                                                                                                                                                    |
| Maximum Latency      | Maximum downstream latency allowed for packets using this service flow, in microseconds.                                                                                                                                                                                                                                                                                                                                                                                   |

#### Related Commands

| Command                                      | Description                                                                                       |
|----------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>cable qos permission</b>                  | Specifies permission for updating the cable router QoS table.                                     |
| <b>cable qos profile</b>                     | Configures a QoS profiles.                                                                        |
| <b>cable service-flow inactivity-timeout</b> | Sets the amount of time a dynamic service flow can be present in the system without any activity. |
| <b>show cable modem</b>                      | Displays information for the registered and unregistered CMs.                                     |

| Command                                  | Description                                                                                                       |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show cable modem access-group</b>     | Displays the access groups for the CMs on a particular cable interface.                                           |
| <b>show cable modem calls</b>            | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem classifiers</b>      | Displays information about the classifiers for a particular CM.                                                   |
| <b>show cable modem connectivity</b>     | Displays connectivity statistics for one or more CMs.                                                             |
| <b>show cable modem registered</b>       | Displays a list of the CMs that are marked as registered with the Cisco CMTS router.                              |
| <b>show cable modem remote-query</b>     | Displays information collected by the remote-query feature.                                                       |
| <b>show cable modem unregistered</b>     | Displays a list of the CMs that are marked as unregistered with the Cisco CMTS router.                            |
| <b>show cable modulation-profile</b>     | Displays modulation profile group information.                                                                    |
| <b>show interface cable modem</b>        | Displays information about the CMs connected to a particular cable interface.                                     |
| <b>show interface cable qos paramset</b> | Displays the DOCSIS 1.1 QoS parameter sets.                                                                       |
| <b>show interface cable sid</b>          | Displays cable interface information.                                                                             |
| <b>show cable qos profile</b>            | Displays quality-of-service (QoS) profiles for a Cisco CMTS router.                                               |

# show cable modem registered

To display a list of the cable modems (CMs) that have registered with the Cisco CMTS, use the **show cable modem registered** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] registered
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
registered
```

### Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                           |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                                   |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |



|                              |                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream port</b>         | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <b>logical-channel-index</b> | (Optional) Displays the logical channel index. Valid values are 0 and 1.                                                                                                                                                                                                                                                        |
| <b>name fqdn</b>             | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |
| <b>registered</b>            | Displays a list of the cable modems that have registered with the Cisco CMTS.                                                                                                                                                                                                                                                   |

**Defaults**

Displays a list of all registered CMs on the Cisco CMTS router.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 12.2(4)BC1  | Support for the Cisco uBR10012 router was introduced.                                                                                                                                                                                                                                                                                                                                                                                                  |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> <li>The alignment of output fields has been changed.</li> </ul> |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                                                                                     |
| 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                                                                                        |

**Usage Guidelines****Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration**

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.



#### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.



#### Note

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

## Examples

### Example in Cisco IOS Release 12.2(33)SCA

The following example shows sample output for the default form of the **show cable modem registered** command in Cisco IOS Release 12.2(33)SCA:

```
Router# show cable modem registered
```

| Interface | Prim<br>Sid | Online<br>State | Timing<br>Offset | Rec<br>Power | QoS | CPE | IP address | MAC address    |
|-----------|-------------|-----------------|------------------|--------------|-----|-----|------------|----------------|
| C3/0/U0   | 1           | online(pt)      | 2024             | 0.00         | 5   | 0   | 10.74.1.60 | 0000.cadb.0bae |
| C3/0/U0   | 2           | online(pt)      | 2032             | 0.00         | 5   | 0   | 10.74.1.58 | 0000.cadb.0512 |
| C3/0/U0   | 3           | online(pt)      | 2024             | 0.50         | 5   | 0   | 10.74.1.61 | 0000.cadb.04b2 |
| C3/0/U0   | 4           | online(pt)      | 3079             | 0.00         | 5   | 0   | 10.74.1.48 | 0003.e3a6.7f71 |
| C3/0/U0   | 5           | online(pt)      | 2558             | -1.00        | 5   | 0   | 10.74.1.50 | 0010.7b6b.77ed |
| C3/0/U0   | 6           | online(pt)      | 3083             | -0.50        | 5   | 0   | 10.74.1.42 | 0030.80bc.22b9 |

### Examples in Cisco IOS Release 12.3BC

The following example shows sample output for the default form of the **show cable modem registered** command.

```
Router# show cable modem registered
```

| Interface   | Prim<br>Sid | Online<br>State | Timing<br>Offset | Rec<br>Power | QoS | CPE | IP address | MAC address    |
|-------------|-------------|-----------------|------------------|--------------|-----|-----|------------|----------------|
| Cable3/0/U0 | 1           | online          | 2812             | -0.25        | 5   | 1   | 10.18.1.5  | 0030.80bc.2303 |
| Cable3/0/U0 | 2           | online          | 2804             | 0.50         | 5   | 0   | 10.18.1.9  | 0006.2854.73f5 |

The following example shows sample output for the **show cable modem registered** command for a particular cable interface:

```
Router# show cable modem c8/1/0 registered
```

| Interface | Prim<br>Sid | Online<br>State | Timing<br>Offset | Rec<br>Power | QoS | CPE | IP address | MAC address    |
|-----------|-------------|-----------------|------------------|--------------|-----|-----|------------|----------------|
| C8/1/0/U1 | 1           | online          | 1548             | 0.00         | 5   | 0   | 10.1.1.11  | 0050.7366.1243 |
| C8/1/0/U4 | 2           | online          | 1925             | 0.00         | 5   | 0   | 10.1.1.10  | 0002.b970.0027 |
| C8/1/0/U4 | 3           | online          | 1918             | -0.50        | 2   | 0   | 10.1.1.10  | 0006.5314.858d |

The following example shows sample output for the **show cable modem registered** command for a single CM, as identified by its IP address:

```
Router# show cable modem 22.1.1.10 registered
```

| Interface | Prim | Online | Timing | Rec   | QoS | CPE | IP address | MAC address    |
|-----------|------|--------|--------|-------|-----|-----|------------|----------------|
|           | Sid  | State  | Offset | Power |     |     |            |                |
| C8/1/0/U4 | 3    | online | 1918   | -0.75 | 2   | 0   | 10.1.1.10  | 0006.5314.858d |

The following example shows sample output for the **show cable modem registered** command for a single CM, as identified by its MAC address:

```
Router# show cable modem 0006.5314.858d registered
```

| Interface | Prim | Online | Timing | Rec   | QoS | CPE | IP address | MAC address    |
|-----------|------|--------|--------|-------|-----|-----|------------|----------------|
|           | Sid  | State  | Offset | Power |     |     |            |                |
| C8/1/0/U4 | 3    | online | 1918   | -0.25 | 2   | 0   | 10.1.1.10  | 0006.5314.858d |



#### Note

An asterisk (\*) in the Receive Power column indicates that a power adjustment has been made for that CM. An exclamation point (!) in the Receive Power column indicates that the CM has reached its maximum power transmit level and cannot increase its power level further. An exclamation point (!) in the Timing Offset column indicates that the CM has exceeded the maximum delay and timing offset specified by the **cable map-advance** command.

A pound sign (#) in the MAC State column indicates that the **cable tftp-enforce mark-only** command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so (Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases).



#### Tip

The **show cable modem** command displays the CM timing offset in DOCSIS ticks, while other commands, such as **cable map-advance**, display the offset in microseconds. Use the following method to convert microseconds to DOCSIS ticks:  $\text{ticks} = \text{microseconds} * 64 / 6.25$ .

Table 119 describes the major fields shown in the **show cable modem registered** displays:

**Table 119** Descriptions for the show cable modem registered Fields

| Field        | Description                                                                  |
|--------------|------------------------------------------------------------------------------|
| Interface    | The cable interface line card providing the upstream for this CM.            |
| Prim SID     | The primary SID assigned to this CM.                                         |
| Online State | The current state of the MAC layer. Should show “online” for registered CMs. |

**Table 119** Descriptions for the show cable modem registered Fields (continued)

| Field         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Timing Offset | <p>The timing offset for the CM, in ticks, as recognized on the CMTS. (A tick, as used here, is 6.25/64 microseconds.) This is the delay between when a particular cable modem is scheduled to make a transmission and when the CMTS actually receives it.</p> <p><b>Note</b> An exclamation point (!) in the Timing Offset column indicates that the CM has exceeded the maximum delay and timing offset specified by the <b>cable map-advance</b> command.</p> <p><b>Note</b> The timing offset shown here is typically smaller than the TX Time Offset value shown by the <b>show cable modem remote-query</b> command, because the latter value is the offset as recognized on the CM (which will include any internal delay between when the CM software begins the transmission and when the bits actually appear on the local cable interface).</p> |
| Rec Power     | <p>The received power level (in dB) for the CM.</p> <p><b>Note</b> An asterisk (*) in the RxPwr column indicates that a power adjustment has been made for that CM. An exclamation point (!) indicates that the CM has reached its maximum power transmit level and cannot increase its power level further.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| QoS           | Displays the QoS profile assigned to the CM (DOCSIS 1.1 and DOCSIS 2.0 CMs only).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CPE           | Indicates the number of CPE devices for which the CM is providing services.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| IP Address    | The IP address that the DHCP server has assigned to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MAC Address   | The MAC address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**Related Commands**

| Command                              | Description                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                  |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                     |
| <b>show cable modem access-group</b> | Displays the access groups for the CMs on a particular cable interface.                                           |
| <b>show cable modem calls</b>        | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem classifiers</b>  | Displays information about the classifiers for a particular CM.                                                   |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                                             |
| <b>show cable modem cpe</b>          | Displays the CPE devices accessing the cable interface through a particular CM.                                   |
| <b>show cable modem offline</b>      | Displays a list of the CMs that are marked as offline with the Cisco CMTS.                                        |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                              |

| Command                              | Description                                                                                             |
|--------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>show cable modem unregistered</b> | Displays a list of the CMs that are marked as unregistered with the Cisco CMTS.                         |
| <b>show cable modem vendor</b>       | Displays the vendor name or Organizational Unique Identifier (OUI) for the CMs on each cable interface. |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                           |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                   |

# show cable modem remote-query

To display information collected by the remote-query feature, use the **show cable modem remote-query** command in privileged EXEC mode.

**show cable modem remote-query**

**Syntax Description** This command has no keywords or arguments.

**Command Modes** Privileged EXEC

| Command History | Release             | Modification                                                              |
|-----------------|---------------------|---------------------------------------------------------------------------|
|                 | 12.0(7)XR, 12.1(2)T | This command was introduced.                                              |
|                 | 12.1(2)EC1          | Support for this command was added to the 12.1 EC train.                  |
|                 | 12.2(4)BC1b         | Support for this command was added to the 12.2 BC train.                  |
|                 | 12.3(23)BC          | Support was added for displaying status of modems during an SNMP request. |

**Usage Guidelines** This command shows the statistics collected when the remote-query feature has been enabled and configured by the **cable modem remote-query** command.

**Note** In Cisco IOS Release 12.1 CX, Cisco IOS Release 12.2 BC, and later, use the **show cable modem phy** command instead of the **show cable modem remote-query** command.



**Tip**

The information shown by this command can also be displayed by querying the attributes in the CISCO-DOCS-REMOTE-QUERY-MIB.



**Note**

Also see the information about this command's behavior in a Hot Standby Connection-to-Connection Protocol (HCCP) configuration, see the [“Operation with Hot Standby Connection-to-Connection Protocol \(HCCP\) Configuration”](#) section on page 1558.

## Examples

The following example shows typical output from the **show cable modem remote-query** command. In this example, the final CM (IP address of 10.200.71.2) has not been configured with an SNMP community string that allows access to the remote-query feature.

```
Router# show cable modem remote-query
Remote Query Polling State : Active
```

| IP address  | MAC address    | S/N Ratio | US Power | DS Power | Tx Time Offset | Micro (dB) Reflection | Modem State |
|-------------|----------------|-----------|----------|----------|----------------|-----------------------|-------------|
| 10.200.71.8 | 0001.9659.47af | 36.6      | 31.0     | 0.0      | 12352          | 17                    | online      |
| 10.200.71.4 | 0001.9659.47c7 | 36.6      | 37.0     | 0.0      | 12352          | 17                    | online      |

```

10.200.71.6 0001.9611.b9a3 36.6 37.0 0.0 12353 15 online
10.200.71.3 0001.9659.47a9 36.6 37.0 0.0 12351 16 online
10.200.71.2 0001.9659.47c1 0.0 0.0 0.0 0 0 online

```

In the following example, the SNMP Request column shows cable modems being offline when an SNMP request using the cable modem remote query command is not received. The modems are either offline or are not responding to the SNMP request.

```

Router# show cable modem remote-query
Remote Query Polling State : Inactive

```

| IP address | MAC address    | S/N<br>Ratio | US<br>Power | DS<br>Power | Tx Time<br>Offset | SNMP<br>Request |
|------------|----------------|--------------|-------------|-------------|-------------------|-----------------|
| 80.51.1.4  | 0018.f826.3453 | 0.0          | 0.0         | 0.0         | 0                 | CM offline      |
| 80.51.1.2  | 000c.e5f6.0c40 | 0.0          | 0.0         | 0.0         | 0                 | CM offline      |
| 80.51.1.8  | 0019.474a.d4fe | 0.0          | 0.0         | 0.0         | 0                 | CM offline      |
| 80.51.1.3  | 0018.6852.82fa | 0.0          | 0.0         | 0.0         | 0                 | CM offline      |
| 80.51.1.5  | 0019.474a.c1ae | 0.0          | 0.0         | 0.0         | 0                 | CM offline      |

Table 0-120 shows the fields displayed by the **show cable modem remote-query** command.

**Table 0-120** Descriptions for the show cable modem remote-query Fields

| Field                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP Address            | The IP address that the DHCP server has assigned to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MAC Address           | The MAC address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| S/N Ratio             | The current signal-to-noise ratio (SNR) on the downstream, as seen by the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| US Power              | The current operational transmit power level, in dBmV, as seen by the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| DS Power              | The received power level, in dBmV, as seen by the CM. This field is set to zero if the CM does not support power level measurements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| TX Time Offset        | <p>The timing offset for the CM, in ticks, as recognized on the CM. (A tick, as used here, is 6.25/64 microseconds.) This is the delay between when a particular cable modem is scheduled to make a transmission and when the CMTS actually receives it. The CM value includes any internal delay between when the CM software begins the transmission and when the bits actually appear on the local cable interface.</p> <p><b>Note</b> The timing offset shown here is typically larger than the Time Offset value shown by the <b>show cable modem</b> command, because the latter value is the offset as recognized on the CMTS (which does not include the internal delay on the CM).</p>                                            |
| Micro (dB) Reflection | <p>The approximate number of total microreflections (including in-channel responses) on the downstream, measured in dBc below the signal level, as seen by the CM. Microreflections are a type of impairment that is caused by impedance mismatches between amplifiers, couples, cables, and other equipment in the cable plant. Microreflections create copies of a signal that arrive at the receiver with different amounts of delay and attenuation, generating intersymbol interference (ISI) that can cause the receiver to improperly detect the amplitude and phase of the incoming signal.</p> <p><b>Note</b> This value is not exact but provides an approximate indication of the microreflections that have been received.</p> |
| Modem State           | The current state of the MAC layer for the CM (see Table 107 on page 1459).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## ■ show cable modem remote-query

The following example shows typical output from the **show cable modem remote-query** command.

Router# **show cable modem remote-query**

| IP address   | MAC address    | S/N<br>Ratio | US<br>Power | DS<br>Power | Tx Time<br>Offset | Micro (dB)<br>Reflection | Modem<br>State |
|--------------|----------------|--------------|-------------|-------------|-------------------|--------------------------|----------------|
| 10.118.4.194 | 0007.0e04.5ba9 | 33.4         | 42.3        | - 1.0       | 8794              | 1                        | online         |
| 10.118.4.156 | 0003.6b1b.e8c9 | 34.0         | 44.0        | - 1.0       | 8795              | 3                        | online(d)      |

Router#

The following example shows typical output from the **show cable modem remote-query** command when the remote-query feature has not been configured.

Router# **show cable modem remote-query**

Remote Query Polling State : Inactive

| IP address   | MAC address    | S/N<br>Ratio | US<br>Power | DS<br>Power | Tx Time<br>Offset | Micro (dB)<br>Reflection | Modem<br>State |
|--------------|----------------|--------------|-------------|-------------|-------------------|--------------------------|----------------|
| 10.200.71.8  | 0001.9659.47af | 0.0          | 0.0         | 0.0         | 0                 | 0                        | online         |
| 10.200.71.4  | 0001.9659.47c7 | 0.0          | 0.0         | 0.0         | 0                 | 0                        | online         |
| 10.200.71.6  | 0001.9611.b9a3 | 0.0          | 0.0         | 0.0         | 0                 | 0                        | online         |
| 10.200.71.3  | 0001.9659.47a9 | 0.0          | 0.0         | 0.0         | 0                 | 0                        | online         |
| 10.200.71.2  | 0001.9659.47c1 | 0.0          | 0.0         | 0.0         | 0                 | 0                        | online         |
| 10.200.71.10 | 00d0.5904.5321 | 0.0          | 0.0         | 0.0         | 0                 | 0                        | offline        |
| 10.200.71.11 | 0050.f112.5123 | 0.0          | 0.0         | 0.0         | 0                 | 0                        | offline        |

Router#

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                               | Description                                                                                        |
|---------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>cable modem remote-query</b>       | Enables and configures the remote-query feature to gather CM performance statistics on the CMTS.   |
| <b>debug cable remote-query</b>       | Turns on debugging to gather information from remote CMs.                                          |
| <b>show cable modem</b>               | Displays information for the registered and unregistered CMs.                                      |
| <b>show cable modem cnr</b>           | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem. |
| <b>snmp-server enable traps cable</b> | Enables traps that are sent when the remote polling of CMs has been completed.                     |



# show cable modem resiliency

To display the resiliency status of the cable modems in resiliency mode on the Cisco CMTS router, use the **show cable modem resiliency** command in privileged EXEC mode.

**show cable modem resiliency**

**Command Default** None

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

**Examples** The following example shows a sample output of the **show cable modem resiliency** command:

Router# **show cable modem resiliency**

| I/F    | MAC Address    | ID  | Orig BG   |     |     | Curr BG   |     |  |
|--------|----------------|-----|-----------|-----|-----|-----------|-----|--|
|        |                |     | I/F       | RFs | ID  | I/F       | RFs |  |
| C7/0/0 | 0025.2eaf.843e | 897 | Wi7/0/0:0 | 4   | 898 | Wi7/0/0:1 | 3   |  |
| C7/0/0 | 0025.2eaf.8356 | 897 | Wi7/0/0:0 | 4   | 899 | Wi7/0/0:2 | 3   |  |
| C7/0/0 | 0015.d176.5199 | 897 | Wi7/0/0:0 | 4   | 720 | In7/0/0:0 |     |  |

[Table 1](#) describes the significant fields shown in the display.

**Table 121** *show cable modem resiliency Field Descriptions*

| Field              | Description                                                     |
|--------------------|-----------------------------------------------------------------|
| <b>I/F</b>         | Modem host interface.                                           |
| <b>MAC Address</b> | MAC address of the cable modem.                                 |
| <b>Orig BG ID</b>  | Original wideband (WB) interface bonding group ID.              |
| <b>I/F</b>         | Original bonding group (BG) WB interface.                       |
| <b>RFs</b>         | Number of RFs originally assigned.                              |
| <b>Curr BG ID</b>  | Currently assigned bonding group ID.                            |
| <b>I/F</b>         | Assigned interface (dynamic WB or narrowband).                  |
| <b>RFs</b>         | Number of RFs in the interface (if assigned to a WB interface). |

| Related Commands | Command                            | Description                                                                        |
|------------------|------------------------------------|------------------------------------------------------------------------------------|
|                  | <b>cable resiliency ds-bonding</b> | Enables the Downstream Resiliency Bonding Group feature on the Cisco CMTS router.  |
|                  | <b>cable ds-resiliency</b>         | Reserves a resiliency bonding group for a line card on the Cisco CMTS router.      |
|                  | <b>show cable resiliency</b>       | Displays all information about resiliency bonding groups on the Cisco CMTS router. |

# show cable modem rf-adapt

To display RF adaptation relocation history for cable modems, use the **show cable modem rf-adapt** command in privileged EXEC mode.

```
show cable modem [mac-address | cable { slot/cable-interface-index |
slot/subslot/cable-interface-index } [upstream port [logical-channel-index]]] rf-adapt
[verbose]
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>mac-address</i>           | (Optional) MAC address of a specific cable modem to be displayed. If you specify the MAC address for a CPE device behind a cable modem, information for that cable modem is displayed.                                                                                                                                                                                                                                                                                                    |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <b>upstream port</b>         | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card.                                                                                                                                                           |
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>rf-adapt</b>              | Displays RF adaptation information.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>verbose</b>               | Displays detailed information for the cable modems.                                                                                                                                                                                                                                                                                                                                                                                                                                       |

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

**Examples**

The following is a sample output of the **show cable modem rf-adapt** command:

```
Router# show cable modem rf-adapt
```

| MAC Address    | Downgrade Count | Upgrade Count | Primary Upstream | Last Action | Last Time       |
|----------------|-----------------|---------------|------------------|-------------|-----------------|
| 0019.474a.d4cc | 1               | 0             | C8/0/1/U3.0      | D           | Jun 25 22:10:22 |
| 0019.474a.d554 | 1               | 1             | C8/0/14/U0.0     | U           | Jun 25 22:10:22 |
| 0019.474a.d542 | 2               | 1             | C8/0/0/U0.0      | D           | Jun 25 22:10:22 |
| 0019.474a.d508 | 1               | 1             | C8/0/8/U0.0      | U           | Jun 25 22:10:23 |
| 0025.2e2d.7400 | 1               | 0             | C8/0/0/U1.0      | D           | Jun 25 22:10:23 |
| 0022.cea4.f404 | 1               | 1             | C8/0/2/U2.0      | U           | Jun 25 22:10:23 |

```
Router# show cable modem 001e.6bfb.2d3c rf-adapt
```

| MAC Address    | Downgrade Count | Upgrade Count | Primary Upstream | Last Action | Last Time      |
|----------------|-----------------|---------------|------------------|-------------|----------------|
| 001e.6bfb.2d3c | 1               | 0             | Ca6/1/0/U0.0     | D           | Mar 7 05:12:37 |

```
Router# show cable modem 0025.2e2d.7990 rf-adapt verbose
```

| Action Time    | Action Type | Source Upstream | Destination Upstream | Action Reason |
|----------------|-------------|-----------------|----------------------|---------------|
| Mar 9 23:03:08 | D           | Ca7/0/0/U0.0    | Ca7/0/0/U0.1         | SNR 26<28     |
| Mar 9 21:50:05 | U           | Ca7/0/0/U0.1    | Ca7/0/0/U0.0         | SNR 31>=31    |
| Mar 9 21:37:02 | D           | Ca7/0/0/U0.0    | Ca7/0/0/U0.1         | SNR 26<28     |
| Mar 9 20:45:59 | U           | Ca7/0/0/U0.1    | Ca7/0/0/U0.0         | SNR 32>=31    |
| Mar 9 20:36:56 | D           | Ca7/0/0/U0.0    | Ca7/0/0/U0.1         | SNR 27<28     |

[Table 89](#) describes the significant fields shown in the display:

**Table 122** *show cable modem Field Descriptions*

| Field                | Description                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------------------|
| MAC Address          | MAC address of the cable modem.                                                                           |
| Downgrade Count      | Number of times the cable modem was relocated from the primary to the secondary logical upstream channel. |
| Upgrade Count        | Number of times the cable modem was relocated from the secondary to the primary logical upstream channel. |
| Primary Upstream     | The primary logical upstream at the time of the relocation event.                                         |
| Last Action          | Last action performed on the cable modem; indicates whether the cable modem was downgraded or upgraded.   |
| Last Action Time     | Date and time when the last action was performed on the cable modem.                                      |
| Action Time          | Date and time when the action was performed on the cable modem.                                           |
| Action Type          | Upgrade or downgrade.                                                                                     |
| Source Upstream      | Upstream logical channel from where the cable modem is moved.                                             |
| Destination Upstream | Upstream logical channel to where the cable modem is moved.                                               |
| Action Reason        | Reason for the relocation of the cable modem.                                                             |

**Related Commands**

| Command                                          | Description                                                                                                                                                               |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable rf-adapt timer</b>                      | Configures timers for RF adaptation.                                                                                                                                      |
| <b>cable upstream rf-adapt</b>                   | Enables RF adaptation on the physical upstream channel.                                                                                                                   |
| <b>cable upstream rf-adapt (logical channel)</b> | Configures the primary upstream logical channel and secondary upstream logical channel.                                                                                   |
| <b>cable upstream threshold</b>                  | Configures the upstream for the signal-to-noise ratio (SNR) and forward error correction (FEC) threshold values to be used in determining the allowable noise levels.     |
| <b>cable upstream threshold hysteresis</b>       | Configures the hysteresis value to be used in conjunction with the dynamic modulation upgrade thresholds.                                                                 |
| <b>cable upstream threshold rf-adapt</b>         | Configures the upstream RF adaptation threshold value, which prevents excessive relocation of modems from the primary upstream channel to the secondary upstream channel. |
| <b>show cable modem</b>                          | Displays information for the registered and unregistered cable modems.                                                                                                    |
| <b>show cable modem phy</b>                      | Displays the DOCSIS PHY layer information for one or more cable modems.                                                                                                   |
| <b>show cable modulation-profile</b>             | Displays modulation profile group information.                                                                                                                            |
| <b>show cable rf-adapt</b>                       | Displays the downgrade and upgrade candidate lists.                                                                                                                       |
| <b>show interface cable modem</b>                | Displays information about the cable modems connected to a particular cable interface.                                                                                    |

# show cable modem rogue

To display a list of cable modems that have been marked, locked, or rejected because they failed the dynamic shared-secret authentication checks, use the **show cable modem rogue** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] rogue
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
rogue
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                       |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                               |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

|                              |                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream</b> <i>port</i>  | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                  |
| <b>name</b> <i>fqdn</i>      | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |
| <b>rogue</b>                 | Displays a list of cable modems that have been marked, locked, or rejected.                                                                                                                                                                                                                                                     |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced for Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers.                                                                                                                                                                                                                                                                                      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> </ul> |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                           |
| 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                              |

**Usage Guidelines**

This command displays a list of cable modems that attempted to register with a DOCSIS configuration file that does not pass the authentication required by the **cable dynamic-secret** command. After a cable modem is added to the rogue list, it remains in the rogue list until one of the following occurs:

- The cable modem remains offline, without attempting to reregister, for 24 hours. It is then removed from all of the CMTS internal databases, including the rogue list.
- An administrator manually deletes the cable modem from the CMTS internal databases, using the **clear cable modem delete** command.
- An administrator unlocks the cable modem using the **clear cable modem lock** command.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

### Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.



**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

### Examples

The following sample output from the **show cable modem rogue** command.

```
Router# show cable modem rogue
```

| MAC Address    | Vendor  | Interface | Spooft Count | TFTP Dnld | Dynamic Secret                   |
|----------------|---------|-----------|--------------|-----------|----------------------------------|
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2            | Yes       | 45494DC933F8F47A398F69EE6361B017 |
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2            | Yes       | D47BCBB5494E9936D51CB0EB66EF0B0A |
| BBBB.7b43.aa7f | Vendor2 | C4/0/U5   | 2            | No        | 8EB196423170B26684BF6730C099D271 |
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2            | No        | DF8FE30203010001A326302430120603 |
| BBBB.7b43.aa7f | Vendor2 | C4/0/U5   | 2            | No        | 300E0603551D0F0101FF040403020106 |
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2            | Yes       | 820101002D1A264CE212A1BB6C1728B3 |
| DDDD.7b43.aa7f | Vendor4 | C4/0/U5   | 2            | Yes       | 7935B694DCA90BC624AC92A519C214B9 |
| AAAA.7b43.aa7f | Vendor1 | C4/0/U5   | 2            | No        | 3AB096D00D56ECD07D9B7AB662451CFF |

```
Router#
```

[Table 0-123](#) describes the fields shown by the **show cable modem rogue** command.

**Table 0-123** show cable modem Field Descriptions

| Field       | Description                                                                                  |
|-------------|----------------------------------------------------------------------------------------------|
| MAC Address | The MAC address for the CM.                                                                  |
| Vendor      | Vendor name for this cable modem, as configured using the <b>cable modem vendor</b> command. |
| Interface   | The cable interface line card providing the upstream for this CM.                            |



**Table 0-123** *show cable modem Field Descriptions (continued)*

| Field          | Description                                                                                                                                                                                                                                                                                                                                                                |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Spoof Count    | Number of times that this cable modem has attempted to register with an invalid dynamic shared-secret value.<br><br><b>Note</b> To account for possible network problems, such as loss of packets and congestion, the Cisco CMTS will allow a cable modem to attempt to register twice before marking it as having failed the dynamic shared-secret authentication checks. |
| TFTP Dnld      | Whether TFTP downloads are enforced, as configured by the <b>cable tftp-enforce</b> command.                                                                                                                                                                                                                                                                               |
| Dynamic Secret | The dynamic shared-secret for this cable modem.                                                                                                                                                                                                                                                                                                                            |

**Related Commands**

| Command                              | Description                                                                                                                                                                                                              |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable dynamic-secret</b>          | Enables the Dynamic Shared Secret feature, so that DOCSIS configuration files are verified with a Message Integrity Check (MIC) that has been created with a dynamically generated shared secret.                        |
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                                                                                                                                         |
| <b>cable shared-secondary-secret</b> | Configures one or more secondary shared secret keys that CMs can use to successfully process the DOCSIS configuration file and register with the CMTS.                                                                   |
| <b>cable shared-secret</b>           | Configures an authentication shared secret key that CMs must use to successfully process the DOCSIS configuration file and register with the CMTS.                                                                       |
| <b>cable tftp-enforce</b>            | Requires that all CMs on a cable interface attempt to download a DOCSIS configuration file using the Trivial File Transfer Protocol (TFTP) through the cable interface before being allowed to register and come online. |
| <b>clear cable modem lock</b>        | Resets the lock on one or more CMs, and reinitializes them, so that they can reregister with a valid DOCSIS configuration file.                                                                                          |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                                                                                                                            |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                                                                                                                                     |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                                                                                                                                            |
| <b>show interface cable sid</b>      | Displays the SID information for a CM.                                                                                                                                                                                   |

# show cable modem service-type-id

To display the modems having the service type id, use the **show cable modem service-type-id** command in privileged EXEC mode.

**show cable modem service-type-id** [*service-type-id*]

|                    |                        |                                                    |
|--------------------|------------------------|----------------------------------------------------|
| Syntax Description | <i>service-type-id</i> | Specifies the name of the service type identifier. |
|--------------------|------------------------|----------------------------------------------------|

|                 |                                                                                                                       |  |
|-----------------|-----------------------------------------------------------------------------------------------------------------------|--|
| Command Default | If no service type identifier is specified, this command will show all the CMs with their respective service-type-id. |  |
|-----------------|-----------------------------------------------------------------------------------------------------------------------|--|

|               |                     |  |
|---------------|---------------------|--|
| Command Modes | Privileged EXEC (#) |  |
|---------------|---------------------|--|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

|                  |                                                          |  |
|------------------|----------------------------------------------------------|--|
| Usage Guidelines | This command shows CMs having specified service-type-id. |  |
|------------------|----------------------------------------------------------|--|

|          |                                                                                                    |  |
|----------|----------------------------------------------------------------------------------------------------|--|
| Examples | The following example shows sample output for the <b>show cable modem service-type-id</b> command: |  |
|----------|----------------------------------------------------------------------------------------------------|--|

Router# **show cable modem service-type-id**

| MAC Address    | IP Address  | I/F       | MAC State | Prim Service-type-id Sid | B D<br>P I<br>I P<br>N N<br>N N<br>N N<br>N N<br>N N<br>N N<br>N N<br>N N<br>N N |
|----------------|-------------|-----------|-----------|--------------------------|----------------------------------------------------------------------------------|
| 0018.6812.29ae | 41.42.2.212 | C6/1/4/U2 | offline   | 3838 commercial          |                                                                                  |
| 0018.6811.f9f8 | 41.42.0.140 | C6/1/4/U2 | offline   | 3225 commercial          |                                                                                  |
| 0018.6811.fba6 | 41.42.5.169 | C6/1/4/U2 | offline   | 3439 commercial          |                                                                                  |
| 0018.6812.225a | 41.42.3.210 | C6/1/4/U2 | offline   | 3355 commercial          |                                                                                  |
| 0018.6811.fa8c | 41.42.1.133 | C6/1/4/U2 | offline   | 3091 commercial          |                                                                                  |
| 0018.6812.37e8 | 41.42.0.136 | C6/1/4/U2 | offline   | 7439 commercial          |                                                                                  |
| 0018.6811.fbca | 41.42.2.255 | C6/1/4/U2 | offline   | 6263 commercial          |                                                                                  |
| 0018.6811.fb44 | 41.42.2.17  | C6/1/4/U2 | offline   | 2996 commercial          |                                                                                  |
| 0018.6812.2f20 | 41.42.0.100 | C6/1/4/U2 | offline   | 3544 commercial          |                                                                                  |

Table 118 describes the significant fields shown in the display.

Table 124 show cable modem service-type-id Field Descriptions

| Field       | Description                                                    |
|-------------|----------------------------------------------------------------|
| MAC Address | Hardware (MAC-layer) address of the cable modem or CPE device. |
| IP Address  | IP address of the cable modem or CPE device.                   |

**Table 124** *show cable modem service-type-id Field Descriptions (continued)*

| Field           | Description                                                                                                    |
|-----------------|----------------------------------------------------------------------------------------------------------------|
| I/F             | The cable interface line card providing the upstream for this CM.                                              |
| MAC State       | The current state of the MAC layer.                                                                            |
| Prim Sid        | Primary Service ID (SID) of the device.                                                                        |
| Service Type Id | Service Type identifier.                                                                                       |
| BPI             | Indicates whether or not Baseline Privacy Interface (BPI) or BPI Plus (BPI+) encryption is enabled for the CM. |
| DIP             | Dual IP flag. Identifies whether or not (“Y” or “N”) the CM or CPE supports both IPv4 and IPv6 addressing.     |

#### Related Commands

| Command                                  | Description                                          |
|------------------------------------------|------------------------------------------------------|
| <b>clear cable modem service-type-id</b> | This command clears the cable modem service type id. |

# show cable modem service-flow

To display information about all service flows associated with a particular modem, use the **show cable modem service-flow** command in privileged EXEC mode.

```
show cable modem {ip-address | mac-address} service-flow [verbose | ds-hardware]
```

## Syntax Description

|                     |                                                                                                                                                                                |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>   | Specifies the IPv4 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                 |
| <i>mac-address</i>  | Identifies the MAC address of a specific CM to be displayed. You can also specify the MAC address for a CPE device behind a CM, and information for that CM will be displayed. |
| <b>service-flow</b> | Displays summary of relevant parameters and statistics for all service flows associated with a particular modem.                                                               |
| <b>verbose</b>      | (Optional) Displays comprehensive details for all service flows associated with a particular modem.                                                                            |
| <b>ds-hardware</b>  | (Optional) Displays details of Baseline Privacy Interface (BPI), Payload Header Suppression (PHS), Downstream Service Identifier (DSID) and other statistical data.            |

## Command Modes

Privileged EXEC (#)

## Command History

| Release      | Modification                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCB1 | This command was introduced for Cisco uBR7200 series and Cisco uBR10012 routers in Cisco IOS Release 12.2(33)SCB1. |
| 12.3(23)BC7  | This command was integrated into Cisco IOS Release 12.3(23)BC7.                                                    |
| 12.2(33)SCE  | This command was modified. The <b>ds-hardware</b> keyword was added.                                               |
| 12.2(33)SCF2 | This command was modified. The command output was enhanced to display upstream buffer control parameters.          |

## Usage Guidelines

The **show cable modem service-flow** command has a verbose and a non-verbose option. The non-verbose command supports live debugging and provides a summary of relevant parameters and statistics for all service flows of a particular modem. The verbose option of the command provides comprehensive details for all service flows associated with a particular modem.

The optional **ds-hardware** keyword is used to display per service flow BPI, PHS, DSID and stats data obtained directly from the hardware on the line card or SPA.

  
**Note**

The output data for unconfigured or non applicable features are not always displayed.

**Examples**

The following is a sample output of the **show cable modem service-flow** command without the verbose option:

```
Router# show cable modem 40.30.0.5 service-flow
```

SUMMARY:

| MAC Address    | IP Address | Host      | MAC    | Prim | Num | Primary    | DS    |
|----------------|------------|-----------|--------|------|-----|------------|-------|
|                |            | Interface | State  | Sid  | CPE | Downstream | RfId  |
| 001a.c30c.7eec | 40.30.0.5  | C7/0/0/U0 | online | 15   | 0   | C7/0/0     | Local |

| Sfid | Dir | Curr  | Sid | Sched | Prio | MaxSusRate | MaxBrst | MinRsvRate | Throughput |
|------|-----|-------|-----|-------|------|------------|---------|------------|------------|
|      |     | State |     | Type  |      |            |         |            |            |
| 31   | US  | act   | 15  | BE    | 0    | 0          | 3044    | 0          | 0          |
| 32   | DS  | act   | N/A | BE    | 0    | 0          | 3044    | 0          | 0          |

UPSTREAM SERVICE FLOW DETAIL:

| SFID | SID | Requests | Polls | Grants | Delayed Grants | Dropped Grants | Packets |
|------|-----|----------|-------|--------|----------------|----------------|---------|
| 31   | 15  | 0        | 0     | 0      | 0              | 0              | 0       |

DOWNSTREAM SERVICE FLOW DETAIL:

| SFID | RP_SFID | QID    | Flg | Policer                         | Scheduler       | FrwdIF  |
|------|---------|--------|-----|---------------------------------|-----------------|---------|
|      |         |        |     | Xmits <td>Drops <td></td> </td> | Drops <td></td> |         |
|      |         |        |     | Xmits <td>Drops <td></td> </td> | Drops <td></td> |         |
| 32   | 32817   | 131124 | 0   | 0                               | 0               | 0       |
|      |         |        |     |                                 |                 | Ca7/0/0 |

Flags Legend:

\$: Low Latency Queue (aggregated)

~: CIR Queue

The following is a sample output of the **show cable modem service-flow** command with the **verbose** option, for Cisco IOS Release 12.2(33)SCF2:

```
Router# show cable modem 0022.cea5.02ba service-flow verbose
```

SUMMARY:

| MAC Address    | IP Address   | Host      | MAC      | Prim | Num | Primary    |
|----------------|--------------|-----------|----------|------|-----|------------|
| DS             |              | Interface | State    | Sid  | CPE | Downstream |
| RfId           |              |           |          |      |     |            |
| 0022.cea5.02ba | 5.60.122.132 | C7/1/0/UB | w-online | 10   | 0   | In7/1/0:0  |
| 840            |              |           |          |      |     |            |

| Sfid | Dir | Curr  | Sid | Sched | Prio | MaxSusRate | MaxBrst | MinRsvRate | Throughput |
|------|-----|-------|-----|-------|------|------------|---------|------------|------------|
|      |     | State |     | Type  |      |            |         |            |            |
| 29   | US  | act   | 10  | BE    | 0    | 100000     | 3044    | 0          | 0          |
| 30   | DS  | act   | N/A | BE    | 0    | 200000     | 3044    | 0          | 0          |

| CfrId | SFID | CM Mac Address | Direction | State | Priority | Matches |
|-------|------|----------------|-----------|-------|----------|---------|
|-------|------|----------------|-----------|-------|----------|---------|

Reg Info Requests Tx : 2  
Reg Info TLV len : 152

UPSTREAM SERVICE FLOW DETAIL:

## show cable modem service-flow

```

Sfid : 29
Mac Address : 0022.cea5.02ba
Type : Primary
Direction : Upstream
Current State : Active
Current QoS Indexes [Prov, Adm, Act] : [3, 4, 4]
Active Time : 03:45
Required Attributes : 0x00000000
Forbidden Attributes : 0x00000000
Aggregate Attributes : 0x00000000
Sid : 10
Service Class Name : REG-US
Traffic Priority : 0
Maximum Sustained rate : 100000 bits/sec
Maximum Burst : 3044 bytes
Minimum Reserved Rate : 0 bits/sec
Minimum Packet Size : 0 bytes

!Upstream Buffer Control Parameters
Minimum Buffer Size : 1000 bytes
Target Buffer Size : 1500 bytes
Maximum Buffer Size : 2000 bytes
Peak Rate : 0 bits/sec
Admitted QoS Timeout : 200 seconds
Active QoS Timeout : 0 seconds
Packets : 3
Bytes : 1020
Rate Limit Delayed Grants : 0
Rate Limit Dropped Grants : 0
Current Throughput : 0 bits/sec, 0 packets/sec
Application Priority : 0
US Bonded : YES
Upstream Bonding Group : UBG-1
Transmit Channel Set : 0x6
Sid Cluster : SC-0, Sid [10 10]
Segments Valid : 3
Segments Discarded : 0
Segments Lost : 0
SID Cluster Switching Information
Total Bytes Requested : 0
Total Time : 0
Outstanding Bytes : 0
Max Requests : 1
Classifiers: NONE
Sid : 10
Request polls issued : 0
BWReqs {Cont,Pigg,RPoll,Other} : 4, 0, 0, 0
No grant buf BW request drops : 0, where:0
Rate exceeded BW request drops : 0
Grants issued : 4
Packets received : 4
Bytes received : 1488
rate-adapt : Disabled
rate-adapt {rcvd, Consec-PB} : 0, 0
Fragment reassembly completed : 0
Fragment reassembly incomplete : 0
Concatenated packets received : 0
Queue-indicator bit statistics : 0 set, 0 granted
Good Codewords rx : 8
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0
Concatenated headers received : 0
Fragmentation headers received : 0

```

```
Fragmentation headers discarded: 0
ARP Requests Received : 2
```

### Examples of show cable modem service-flow ds-hardware Command Output for Various Types of Modems

The following is a sample output of the **show cable modem service-flow ds-hardware** command on the narrow band modem on a legacy interface:

```
Router# show cable modem 50.3.112.12 service-flow ds-hardware
```

```
LC SFID:15 RP SFID: 32999
KeyIndex: 6 PHSIndex: 0
TX Pkts: 9 TX Bytes: 636
BPI -
Said: 0x1 KeySeq:0x1
Even Key: 15DC474264C81500 Even Iv: 2619043723FB046B
Odd Key: 07A89421B4458B00 Odd Iv: 1FB0253D0D1C1643
PHS -
PHSM: 0000-0000-0000-0000
Ctrl: 0x0 PHSI: 0x0 PHSS: 0x0 Count: 0x0
```

The following is a sample output of the **show cable modem service-flow ds-hardware** command on the narrow band modem with a modena remote primary channel:

```
Router# show cable modem 50.3.112.6 service-flow ds-hardware
```

```
LC SFID:7 RP SFID: 33007 StatIndex: 13
KeyIndex: 7 PHSIndex: 0
TX Pkts: 8 TX Bytes: 592
BPI -
KeyNum: 0x7 Control: 0xC001 KeySeq: 0x1
Even Key: 10F4-6BE1-D944-B0 Even Iv: 04B3-1CCD-25DA-163E
Odd Key: 0818-8A00-9D01-1E Odd Iv: 1C58-1967-16BC-0BD0
PHS -
PHSM: 0000-0000-0000-0000
Ctrl: 0x0 PHSI: 0x0 PHSS: 0x0 Count: 0x0
```

The following is a sample output of the **show cable modem service-flow ds-hardware** command on the wideband modem on a remote modena:

```
Router# show cable modem 50.3.112.28 service-flow ds-hardware
```

```
LC SFID:9 RP SFID: 33001 StatIndex: 7
KeyIndex: 4 PHSIndex: 0
TX Pkts: 13 TX Bytes: 962
DSID: 0x11E Priority: 0x0 SCC: 0 Seqnum: 0xD
BPI -
KeyNum: 0x4 Control: 0xC002 KeySeq: 0x1
Even Key: 01B8-5830-9246-66 Even Iv: 0BAB-1CA8-0145-1AB9
Odd Key: 0720-8C81-FD04-6F Odd Iv: 0D80-13F1-0E32-083B
PHS -
PHSM: 0000-0000-0000-0000
Ctrl: 0x0 PHSI: 0x0 PHSS: 0x0 Count: 0x0
```

The following is a sample output of the **show cable modem service-flow ds-hardware** command on the narrowband modem on an integrated interface:

```
Router# show cable modem 80.36.0.3 service-flow ds-hardware
```

```
LC SFID:50 RP SFID: 33150 StatIndex: 21
KeyIndex: 8 PHSIndex: 0
TX Pkts: 4 TX Bytes: 648
BPI (DES) -
KeyNum: 0x3 Said: 0x16 KeySeq:0x1
Even Key: 0A3C-5BC0-C9C0-9F Even Iv: 0204-25F7-07A1-026E
Odd Key: 0448-0392-26C4-55 Odd Iv: 087F-0B13-237A-1F89
```

## ■ show cable modem service-flow

```
PHS -
PHSM: 0000-0000-0000-0000
Ctrl: 0x0 PHSI: 0x0 PHSS: 0x0 Count: 0x0
```

The following is a sample output of the **show cable modem service-flow ds-hardware** command on the wideband modem on a bonded local interface:

```
Router# show cable modem 80.36.0.122 service-flow ds-hardware
```

```
LC SFID:46 RP SFID: 33148 StatIndex: 19
KeyIndex: 7 PHSIndex: 0
TX Pkts: 200 TX Bytes: 23600
DSID: 0x152 Priority: 0x0 Seqnum: 0xC8
Enabled: 0x1 DPV Enabled: 0x0 SeqNum Change Cnt: 0x0
BPI (DES) -
KeyNum: 0x3 Said: 0x14 KeySeq:0x1
Even Key: 08E0-8C51-8AC2-A5 Even Iv: 0EA2-1FA8-1C32-2685
Odd Key: 12F4-3980-C984-53 Odd Iv: 0DA1-0BA2-0E4F-0864
PHS -
PHSM: 0000-0000-0000-0000
Ctrl: 0x0 PHSI: 0x0 PHSS: 0x0 Count: 0x0
```

Table 1 describes the significant fields shown in the output.

**Table 125** *show cable mode service-flow Field Descriptions*

| Field              | Description                                                    |
|--------------------|----------------------------------------------------------------|
| MAC Address        | Hardware (MAC-layer) address of the cable modem or CPE device. |
| IP Address         | IP address of the cable modem or CPE device.                   |
| Host Interface     | Host interface name.                                           |
| MAC State          | Current state of the MAC layer.                                |
| Prim Sid           | Primary SID assigned to this CM.                               |
| Num CPE            | Number of CPE devices for which the CM is providing services.  |
| Primary Downstream | Primary downstream channel assigned to the CM.                 |
| DS RfId            | Downstream RF identifier.                                      |
| SFID               | Service flow identifier.                                       |
| SID                | Service ID (SID) of the device.                                |
| Requests           | Number of requests.                                            |
| Polls              | Number of polls.                                               |
| Grants             | Number of grants.                                              |
| Delayed Grants     | Number of delayed grants.                                      |
| Dropped Grants     | Number of dropped grants.                                      |
| Packets            | Number of packets.                                             |
| RP_SFID            | Route processor SFID.                                          |
| QID                | Link queue identification number.                              |
| Flg                | Indicates whether the queue is low latency or CIR.             |
| Policer Xmits      | Packets transmitted out of the policer.                        |



**Table 125** *show cable mode service-flow Field Descriptions (continued)*

| Field           | Description                                                                                 |
|-----------------|---------------------------------------------------------------------------------------------|
| Drops           | Packets dropped by the policer.                                                             |
| Scheduler Xmits | Packets transmitted out of the scheduler.                                                   |
| Drops           | Packets dropped by the scheduler.                                                           |
| FrwdIF          | Forwarding interface.                                                                       |
| LC SFID         | Line card SFID.                                                                             |
| KeyIndex        | Per flow index to BPI data.                                                                 |
| PHSIndex        | Per flow index to PHS data.                                                                 |
| TX Pkts         | Number of packets the router has transmitted on this service flow.                          |
| TX Bytes        | Number of bytes the router has transmitted on this service flow.                            |
| BPI             | Indicates whether or not Baseline Privacy Interface (BPI) encryption is enabled for the CM. |
| Said            | Security association identifier.                                                            |
| KeySeq          | Downstream traffic key sequence number.                                                     |
| Even Key        | Even traffic encryption key (TEK) value.                                                    |
| Even Iv         | Value of the even Initialization Vector (IV).                                               |
| Odd Key         | Odd TEK key value.                                                                          |
| Odd Iv          | Odd IV value.                                                                               |
| PHS             | Payload header suppression.                                                                 |
| PHSM            | PHS Mask. 5-bit PHS mask that defines the header bytes that should be suppressed.           |
| Ctrl            | Control block.                                                                              |
| PHSI            | PHS Index. Number that uniquely references the PHS rule.                                    |
| PHSS            | PHS Size. 8-bit value specifying the number of header bytes to be suppressed.               |
| Count           | PHS rule usage count.                                                                       |

**Related Commands**

| Command                              | Description                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                                     |
| <b>show cable modem access-group</b> | Displays the access groups for the CMs on a particular cable interface.                                           |
| <b>show cable modem calls</b>        | Displays displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem classifiers</b>  | Displays information about the classifiers for a particular CM.                                                   |
| <b>show cable modem cnr</b>          | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                                             |

| Command                              | Description                                                                                                                    |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>show cable modem counters</b>     | Displays downstream and upstream traffic counters for one or more CMs.                                                         |
| <b>show cable modem cpe</b>          | Displays the CPE devices accessing the cable interface through a particular CM.                                                |
| <b>show cable modem domain-name</b>  | Updates the cable-specific DNS cache and display the domain name for specified CMs and CPE behind a CM on a Cisco CMTS router. |
| <b>show cable modem errors</b>       | Displays error statistics for one or more CMs.                                                                                 |
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more CMs.                                                                             |
| <b>show cable modem ipv6</b>         | Displays IPv6 information for specified CMs and CPE behind a CM on a Cisco CMTS router.                                        |
| <b>show cable modem mac</b>          | Displays MAC layer information for one or more CMs.                                                                            |
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more CMs.                                                        |
| <b>show cable modem offline</b>      | Displays a list of the CMs that are marked as offline with the Cisco CMTS.                                                     |
| <b>show cable modem phy</b>          | Displays the DOCSIS PHY layer information for one or more CMs.                                                                 |
| <b>show cable modem qos</b>          | Displays quality of service (QoS) and service flow information for a particular CM.                                            |
| <b>show cable modem registered</b>   | Displays a list of the CMs that are marked as registered with the Cisco CMTS.                                                  |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                                                                    |

# show cable modem sysDescr

To display the system description of a particular cable modem (CM) on the Cisco CMTS router, use the **show cable modem sysDescr** command in privileged EXEC mode.

**show cable modem** {*ip-address* | *mac-address*} **sysDescr** [**community** *community-name*]

|                    |                       |                                                                                                    |
|--------------------|-----------------------|----------------------------------------------------------------------------------------------------|
| Syntax Description | <i>ip-address</i>     | IPv4 address of the cable modem to be displayed.                                                   |
|                    | <i>mac-address</i>    | MAC address of the cable modem to be displayed.                                                    |
|                    | <b>sysDescr</b>       | Displays cable modem system description.                                                           |
|                    | <b>community</b>      | (Optional) Displays the cable modem community name provided in the cable modem configuration file. |
|                    | <i>community-name</i> |                                                                                                    |

**Command Modes** Privileged EXEC (#)

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.2(33)SCG2 | This command was introduced. |

**Usage Guidelines** You must enable the Simple Network Management Protocol (SNMP) manager process using the **snmp-server manager** command in global configuration mode before using the **show cable modem sysDescr** command. The **show cable modem sysDescr** command displays result for IPv4 cable modems only.

In Cisco IOS Release 12.2(33)SCG1 and earlier, you cannot view the system description of a single cable modem. Instead, you can view system descriptions of all the cable modems connected to the Cisco CMTS router. To view system descriptions of all cable modems, enable remote query on the Cisco CMTS router using the **cable modem remote-query** command in global configuration mode. Then, run the **show cable modem | include sysDescr** command.



**Note** The remote query functionality might impact system performance because it queries all the cable modems connected to the Cisco CMTS router.

**Examples**

The following is a sample output of the **show cable modem sysDescr** command that displays system description of the specified cable modem:

```
Router# show cable modem 001c.ea37.9b52 sysDescr
```

```
Querying remote CM...
```

```
Response received
```

```
00:26:53 edt Fri Jan 4 2013
```

```
Last Poll
```

```
Started:00:26:53 edt Fri Jan 4 2013
```

```
Ended: 00:26:53 edt Fri Jan 4 2013
```

```

I/F IP Address MAC Address sysDescr

Cable7/1/2 40.101.0.7 001c.ea37.9b52 S-A DOCSIS CABLE MODEM <<HW_REV: 1.0; VENDOR:
S-A; BOOTR: 2.1.7c; SW_REV: v202r1061-061016;
MODEL: DPC2505>>
```

**Table 126** *show cable modem sysDescr Field Descriptions*

| Field       | Description                     |
|-------------|---------------------------------|
| I/F         | Cable interface.                |
| IP Address  | IPv4 address of the CM.         |
| MAC Address | MAC address of the CM.          |
| sysDescr    | Cable modem system description. |

**Related Commands**

| Command                         | Description                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>cable modem remote-query</b> | Enables the remote query functionality on the Cisco CMTS router to gather cable modem performance statistics. |
| <b>snmp-server manager</b>      | Enables the SNMP manager process.                                                                             |

# show cable modem summary

To display a summary of CMs on one or more cable interfaces, use the **show cable modem summary** command in privileged EXEC mode.

**show cable modem summary [total]**

**show cable modem summary interface1 [interface2] total**

**show cable modem summary interface1 [interface2] upstream port1 port2 total**

**show cable modem cable {slot/port | slot/cable-interface-index} [upstream port  
[logical-channel-index]] summary**

**show cable modem cable {slot/subslot/port | slot/subslot/cable-interface-index} [upstream port  
[logical-channel-index]] summary**

## Syntax Description

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>total</b>      | (Optional) Displays a footer line showing the totals for each column.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>interface1</b> | <p>(Optional) Cable interface to be summarized. The <i>interface1</i> parameter can take the following forms:</p> <ul style="list-style-type: none"> <li>• <b>cable {slot/port   slot/cable-interface-index}</b></li> <li>• <b>cable {slot/subslot/port   slot/subslot/cable-interface-index}</b></li> </ul> <p>where,</p> <ul style="list-style-type: none"> <li>• <i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> <li>– Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>– Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>– Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul> </li> <li>• <i>subslot</i>—(Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.</li> <li>• <i>port</i>—Downstream port number. <ul style="list-style-type: none"> <li>– Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>– Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul> </li> <li>• <i>cable-interface-index</i>—Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>– Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>– Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> </li> </ul> |

## ■ show cable modem summary

|                                    |                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>interface2</i>                  | (Optional) Second cable interface, specifying a range of cable interfaces to be summarized. The <i>interface2</i> parameter has the same form as <i>interface1</i> .<br><br><b>Note</b> When specifying a range of cable interfaces, <i>interface1</i> must be the lower-numbered interface and <i>interface2</i> must be the higher-numbered interface. |
| <b>upstream</b> <i>port1 port2</i> | (Optional) Specifies a range of upstream ports on the cable interfaces to be summarized. The <i>port1</i> and <i>port2</i> parameters can start at 0, and <i>port2</i> must be a higher-numbered port than <i>port1</i> .                                                                                                                                |
| <b>upstream</b> <i>port</i>        | (Optional) Specifies a specific upstream port to be summarized. This option can be specified only when summarizing a single cable interface.                                                                                                                                                                                                             |
| <i>logical-channel-index</i>       | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                                           |
| <b>summary</b>                     | Displays a summary of CMs on one or more cable interfaces.                                                                                                                                                                                                                                                                                               |

## Command Modes

Privileged EXEC (#)

## Command History

| Release                  | Modification                                                                                                          |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 11.3XA                   | This command was introduced.                                                                                          |
| 12.1(4)CX and 12.2(4)BC1 | Support was added for the Cisco uBR10012 router.                                                                      |
| 12.1(6)EC                | The <b>total</b> option was supported for the Cisco uBR7100 series and Cisco uBR7200 series routers.                  |
| 12.1(11b)EC              | The upstream Description field was added to the <b>show cable modem summary</b> display in Cisco IOS Release 12.1 EC. |
| 12.2(8)BC1               | The <b>total</b> option was supported for the Cisco uBR10012 universal broadband router.                              |
| 12.2(15)BC2              | The upstream Description field was added to the <b>show cable modem summary</b> display in Cisco IOS Release 12.2 BC. |
| 12.3(21)BC               | Support was added for wideband cable modem output.                                                                    |
| 12.2(33)SCA              | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.    |
| 12.2(33)SCE              | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                    |
| 12.2(33)SCF              | This command was modified. The <i>logical-channel-index</i> argument was added.                                       |

## Usage Guidelines

This command displays a summary of CMs for a single cable interface or upstream, or for a range of cable interfaces or upstreams. The following possible combinations are possible for this command:

- **show cable modem summary total**—Displays a summary and a total for all CMs on the chassis.
- **show cable modem summary cable x/0 total**—Displays a summary of CMs on a specified card.
- **show cable modem summary cable x/0 upstream port1 port2 total**—Displays a summary of CMs on the specified card and specified range of ports. The *port1* value must be less than the *port2* value.

- **show cable modem summary cable x/0 cable y/0 total**—Displays a summary of CMs on the specified range of cards.
- **show cable modem summary cable x/0 cable y/0 upstream port1 port2 total**—Displays a summary of CMs on the specified range of ports on the specified range of cards.

**Note**

Also see the information about this command's behavior in a Hot Standby Connection-to-Connection Protocol (HCCP) configuration, see the "Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration" in the *Cisco Broadband Cable Command Reference Guide*.

**Examples**

The following example shows typical output for the default form of the **show cable modem summary** command on a Cisco uBR7200 series router:

```
Router# show cable modem summary
```

| Interface   | Total<br>Modems | Active<br>Modems | Registered<br>Modems | Description |
|-------------|-----------------|------------------|----------------------|-------------|
| Cable3/0/U0 | 165             | 141              | 141                  | Line 32/1   |
| Cable3/0/U1 | 209             | 172              | 170                  | Line 32/2   |
| Cable3/0/U2 | 262             | 207              | 203                  | Line 32/3   |
| Cable3/0/U3 | 256             | 194              | 188                  | Line 32/4   |
| Cable5/0/U0 | 746             | 714              | 711                  | Line 41/1   |
| Cable6/0/U0 | 806             | 764              | 759                  | Line 42/2   |

```
Router#
```

**Note**

The Description field appears in Cisco IOS Release 12.1(11b)EC, 12.2(15)BC2, and later releases, and shows the string configured for the upstream using the **cable upstream description** command.

The following example shows typical output for the **show cable modem summary** command with the **total** option on a Cisco uBR7200 series router:

```
Router# show cable modem summary total
```

| Interface   | Total<br>Modems | Active<br>Modems | Registered<br>Modems | Description |
|-------------|-----------------|------------------|----------------------|-------------|
| Cable5/0/U0 | 746             | 714              | 711                  | Node1       |
| Cable6/0/U1 | 806             | 764              | 759                  | Node3       |
| Total:      | 1552            | 1478             | 1470                 |             |

```
Router#
```

The following example shows sample output for the **show cable modem summary** command with the **total** option for a Cisco uBR10012 router:

```
Router# show cable modem summary total
```

| Interface          | Cable |      |       |         | Modem    |        |       |        |       | Description |  |  |  |
|--------------------|-------|------|-------|---------|----------|--------|-------|--------|-------|-------------|--|--|--|
|                    | Total | Reg  | Unreg | Offline | Wideband | initRC | initD | initIO | initO |             |  |  |  |
| C5/0/0/U0          | 84    | 84   | 0     | 0       | 84       | 0      | 0     | 0      | 0     |             |  |  |  |
| C5/0/0/U1          | 84    | 84   | 0     | 0       | 84       | 0      | 0     | 0      | 0     |             |  |  |  |
| C5/0/0/U2          | 83    | 83   | 0     | 0       | 83       | 0      | 0     | 0      | 0     |             |  |  |  |
| C5/0/0/U3          | 83    | 83   | 0     | 0       | 83       | 0      | 0     | 0      | 0     |             |  |  |  |
| <<output omitted>> |       |      |       |         |          |        |       |        |       |             |  |  |  |
| Total:             | 8020  | 8020 | 0     | 0       | 8016     | 0      | 0     | 0      | 0     |             |  |  |  |

## ■ show cable modem summary

Router#

The following example shows sample output for the **show cable modem summary total** command for a range of interfaces on the Cisco uBR10012 router:

Router# **show cable modem summary c5/1/1 c5/1/2 total**

| Interface | Cable Modem |     |       |         | Description |        |       |        |       |
|-----------|-------------|-----|-------|---------|-------------|--------|-------|--------|-------|
|           | Total       | Reg | Unreg | Offline | Wideband    | initRC | initD | initIO | initO |
| C5/1/1/U0 | 84          | 84  | 0     | 0       | 84          | 0      | 0     | 0      | 0     |
| C5/1/1/U1 | 84          | 84  | 0     | 0       | 83          | 0      | 0     | 0      | 0     |
| C5/1/1/U2 | 83          | 83  | 0     | 0       | 83          | 0      | 0     | 0      | 0     |
| C5/1/1/U3 | 83          | 83  | 0     | 0       | 83          | 0      | 0     | 0      | 0     |
| C5/1/2/U0 | 84          | 84  | 0     | 0       | 84          | 0      | 0     | 0      | 0     |
| C5/1/2/U1 | 84          | 84  | 0     | 0       | 84          | 0      | 0     | 0      | 0     |
| C5/1/2/U2 | 83          | 83  | 0     | 0       | 83          | 0      | 0     | 0      | 0     |
| C5/1/2/U3 | 83          | 83  | 0     | 0       | 83          | 0      | 0     | 0      | 0     |
| Total:    | 668         | 668 | 0     | 0       | 667         | 0      | 0     | 0      | 0     |

Router#

The following example shows sample output for the **show cable modem summary total** command for a range of interfaces and upstreams on the Cisco uBR10012 router:

Router# **show cable modem summary c5/1/1 c5/1/2 upstream 0 1 total**

| Interface | Cable Modem |     |       |         | Description |        |       |        |       |
|-----------|-------------|-----|-------|---------|-------------|--------|-------|--------|-------|
|           | Total       | Reg | Unreg | Offline | Wideband    | initRC | initD | initIO | initO |
| C5/1/1/U0 | 84          | 84  | 0     | 0       | 84          | 0      | 0     | 0      | 0     |
| C5/1/1/U1 | 84          | 84  | 0     | 0       | 83          | 0      | 0     | 0      | 0     |
| C5/1/2/U0 | 84          | 84  | 0     | 0       | 84          | 0      | 0     | 0      | 0     |
| C5/1/2/U1 | 84          | 84  | 0     | 0       | 84          | 0      | 0     | 0      | 0     |
| Total:    | 336         | 336 | 0     | 0       | 335         | 0      | 0     | 0      | 0     |

Router#

**Note**

When displaying a summary for a range of ports or cable interfaces, the first port or cable interface (for example, u0 or c4/0) must be lower-numbered than the second port or interface (for example, u6 or c6/0). If you specify the higher-numbered port or interface first, the display shows no CMs connected.

[Table 0-127](#) describes the fields shown in the **show cable modem summary** displays:

**Table 0-127 Descriptions for the show cable modem summary Fields**

| Field                    | Description                                                                                                                                                                                |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface                | The cable interface line card providing the upstream for the CMs.                                                                                                                          |
| Total Modems or Total    | Total number of CMs, registered, unregistered, and offline for this interface.                                                                                                             |
| Registered Modems or Reg | Total number of CMs that have registered and are online on this interface. This number might be different from the Total Modems number if some modems are offline or not fully registered. |
| Unregistered Modems      | Total number of CMs that are either offline and not currently communicating with the CMTS, or attempting to come online but are not yet registered.                                        |



**Table 0-127 Descriptions for the show cable modem summary Fields (continued)**

| Field       | Description                                                                                                  |
|-------------|--------------------------------------------------------------------------------------------------------------|
| Offline     | Total number of CMs that were online or attempted to register but are no longer communicating with the CMTS. |
| Wideband    | CM is registered as a wideband CM.                                                                           |
| init(rc)    | MAC state of CM is init(rc).                                                                                 |
| init(d)     | MAC state of CM is init(d).                                                                                  |
| init(io)    | MAC state of CM is init(io).                                                                                 |
| init(o)     | MAC state of CM is init(o).                                                                                  |
| Description | Description entered for this upstream using the <a href="#">cable upstream description</a> command.          |

**Note**

For information on MAC states, see the show cable modem command.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                              | Description                                                                                              |
|--------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                            |
| <b>show cable modem access-group</b> | Displays the access groups for the CMs on a particular cable interface.                                  |
| <b>show cable modem calls</b>        | Displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                                    |
| <b>show cable modem counters</b>     | Displays downstream and upstream traffic counters for one or more CMs.                                   |
| <b>show cable modem cpe</b>          | Displays the CPE devices accessing the cable interface through a particular CM.                          |
| <b>show cable modem offline</b>      | Displays a list of the CMs that are marked as offline with the Cisco CMTS.                               |
| <b>show cable modem registered</b>   | Displays a list of the CMs that are marked as registered with the Cisco CMTS.                            |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                                              |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                     |
| <b>show cable modem unregistered</b> | Displays a list of the CMs that are marked as unregistered with the Cisco CMTS.                          |

| Command                           | Description                                                                                             |
|-----------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>show cable modem vendor</b>    | Displays the vendor name or Organizational Unique Identifier (OUI) for the CMs on each cable interface. |
| <b>show interface cable modem</b> | Displays information about the CMs connected to a particular cable interface.                           |
| <b>show interface cable sid</b>   | Displays cable interface information.                                                                   |
| <b>show cable modem wideband</b>  | Displays information for a wideband CMs.                                                                |

# show cable modem summary wb-rf

To display the number of RF channels that are down on a cable interface, use the **show cable modem summary wb-rf** command in privileged EXEC mode.

**show cable modem** [**cable** *slot/subslot/port*] **summary wb-rf** [**modular-cable** *slot/bay/port:nb-channel-number*]

| <b>Syntax Description</b> | <div> <div><b>cable</b> <i>slot/subslot/port</i></div> <div>(Optional) Specifies the cable interface. The following are the valid values: <ul style="list-style-type: none"> <li><i>slot</i>—Specifies the chassis slot number of the cable interface line card. Valid values are 5 to 8.</li> <li><i>subslot</i>—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Specifies the port number. Valid values are 0 to 4 (depending on the cable interface).</li> </ul> </div> </div> <div> <div><b>modular-cable</b> <i>slot/bay/port:nb-channel-number</i></div> <div>(Optional) Specifies the modular cable interface. The following are the valid values: <ul style="list-style-type: none"> <li><i>slot</i>—The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs.</li> <li><i>bay</i>—The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).</li> <li><i>port</i>—Specifies the interface number on the SPA.</li> <li><i>nb-channel-number</i>—Specifies the narrowband channel number.</li> </ul> </div> </div> |         |              |             |                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-------------|------------------------------|
| <b>Command Default</b>    | No default behavior or values.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |              |             |                              |
| <b>Command Modes</b>      | Privileged EXEC (#)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |              |             |                              |
| <b>Command History</b>    | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>12.2(33)SCB</td><td>This command was introduced.</td></tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Release | Modification | 12.2(33)SCB | This command was introduced. |
| Release                   | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |              |             |                              |
| 12.2(33)SCB               | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |              |             |                              |

**Examples**

The following is a sample output of the **show cable modem summary wb-rf** command on the cable interface at slot/subslot/port 8/0/0:

```
Router# show cable modem cable 8/0/0 summary wb-rfs
```

| Total<br>RF | Total<br>w-online | Percent<br>RF down | RF down |
|-------------|-------------------|--------------------|---------|
| -----       | -----             | -----              | -----   |
| 1/0/0 0     | 4                 | 0                  | 0       |
| 1           | 6                 | 0                  | 0       |
| 2           | 7                 | 0                  | 0       |

The following is a sample output of the **show cable modem summary wb-rf** command on the modular cable interface at slot/bay/port and narrowband channel 1/0/0 18:

```
Router# show cable modem c8/0/0 summary wb-rfs modular-cable 1/0/0 18
```

| Total<br>RF | Total<br>w-online | Percent<br>RF down | RF down |
|-------------|-------------------|--------------------|---------|
| -----       | -----             | -----              | -----   |
| 1/0/0 18    | 0                 | 0                  | 0       |

**Related Commands**

| Command                         | Description                                                |
|---------------------------------|------------------------------------------------------------|
| <b>show cable modem summary</b> | Displays a summary of CMs on one or more cable interfaces. |

# show cable modem tcs summary

To display transmit channel set (TCS) information on the Cisco CMTS router, use the **show cable modem tcs summary** command in privileged EXEC mode.

## show cable modem tcs summary

### Syntax Description

There are no keywords or arguments.

### Command Modes

Privileged EXEC (#)

### Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCG | This command was introduced. |

### Examples

Following is a sample output of the **show cable modem tcs summary** command:

Router# **show cable modem tcs summary**

| Interface                            | Cable Modem |     |      |       |         |          |      |      |
|--------------------------------------|-------------|-----|------|-------|---------|----------|------|------|
|                                      | Total       | Reg | Oper | Unreg | Offline | Wideband | TCS  | USCB |
| C7/0/0/U0-3                          | 8           | 8   | 8    | 0     | 0       | 8        | 3840 | 1,2  |
| C7/0/0/U0                            | 3           | 3   | 3    | 0     | 0       | 2        |      |      |
| C7/0/0/U1                            | 2           | 2   | 2    | 0     | 0       | 2        |      |      |
| C7/0/0/U3                            | 5           | 5   | 5    | 0     | 0       | 0        |      |      |
| C7/1/0/U3                            | 1           | 1   | 1    | 0     | 0       | 0        |      |      |
| C7/1/1/U0                            | 1           | 0   | 0    | 1     | 1       | 0        |      |      |
| C8/0/0/U0-1,2,0,3<br>1,2,3,4,5,6,7,8 | 3           | 3   | 3    | 0     | 0       | 3        | 3840 |      |
| Total:                               | 23          | 22  | 22   | 1     | 1       | 15       |      |      |



#### Note

In the above example, the interface value indicates the upstream channels of the TCS. The interface is displayed as *U0-1 3 5-7* when the TCS is U0, U1, U3, U5, U6, U7 and if it is a logical channel, the interface is displayed as *U0.0,1.0,3.0*.

[Table 128](#) describes the significant fields shown in the display:

**Table 128** *show cable modem tcs summary Field Descriptions*

| Field                    | Description                                                                                                                                                                                |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface                | Cable interface line card providing the upstream for the CMs.                                                                                                                              |
| Total Modems or Total    | Total number of CMs, registered, unregistered, and offline for this interface.                                                                                                             |
| Registered Modems or Reg | Total number of CMs that have registered and are online on this interface. This number might be different from the Total Modems number if some modems are offline or not fully registered. |

**Table 128** *show cable modem tcs summary Field Descriptions (continued)*

| Field                        | Description                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oper                         | Total number of CMs that are operational.                                                                                                                 |
| Unregistered Modems or Unreg | Total number of CMs that are either offline and not currently communicating with the Cisco CMTS, or attempting to come online but are not yet registered. |
| Offline                      | Total number of CMs that were online or attempted to register but are no longer communicating with the Cisco CMTS.                                        |
| Wideband                     | CM is registered as a wideband CM.                                                                                                                        |
| TCS                          | TCS ID.                                                                                                                                                   |
| USCB                         | Upstream bonding group ID.                                                                                                                                |

**Related Commands**

| Command                           | Description                                                                                            |
|-----------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>show cable modem</b>           | Displays information for the registered and unregistered CMs on the Cisco CMTS router.                 |
| <b>show interface cable modem</b> | Displays information about the CMs connected to a particular cable interface on the Cisco CMTS router. |
| <b>show cable modem wideband</b>  | Displays information for a wideband CM on the Cisco CMTS router.                                       |

# show cable modem type

To display cable modem (CM) provisioning information for all CMs, such as boot mode configuration and MAC and IP address information, use the **show cable modem type** command in privileged EXEC configuration mode.

## Cisco uBR7246VXR Router and Cisco uBR7225VXR Router

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] type
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn] type
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                       |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                               |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

## ■ show cable modem type

|                              |                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream port</b>         | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <b>logical-channel-index</b> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                  |
| <b>name fqdn</b>             | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                       |
|-------------|----------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was introduced.                                                                       |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> . |
| 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                    |

## Usage Guidelines

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

## Examples

The following example shows sample output for the **show cable modem type** command :

```
Router# show cable modem type
```

```
Boot Mode configuration:
```

```
P - Primary Boot mode (IPv6 or IPv4)
```

```
D - Dual Stack (Yes/No)
```

```
A - Alternative Provisioning Mode (Yes/No)
```

```
MAC Address Interface P/D/A IPv4 address IPv6 Address
0004.27a5.b761 C6/0/2/U1 v6/N/N 10.7.0.161 ---
0007.0e01.d9a1 C6/0/2/U0 v6/N/N 10.7.0.162 ---
0006.2854.7275 C6/0/2/U1 v6/Y/N 10.7.0.3 2001:0DB8:3800:80B:7565:5B87:1D7D:5AD5
0018.6835.27dd C6/0/U0 v6/N/N --- 2001:0DB8:3800:803:41D7:DECC:F15D:133
```

Table 129 describes the significant fields shown in the display.

**Table 129** show cable modem type Field Descriptions

| Field       | Description                                                     |
|-------------|-----------------------------------------------------------------|
| MAC Address | MAC address of this CM.                                         |
| Interface   | Cable line card interface and upstream associated with this CM. |



**Table 129** *show cable modem type Field Descriptions (continued)*

| Field        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P/D/A        | <p>String of 3 values representing the boot mode configuration of the CM as follows:</p> <ul style="list-style-type: none"> <li>P—Primary Boot Mode, where “v4” or “v6” indicates IPv4 or IPv6 as the primary addressing mode.</li> <li>D—Dual Stack, where “Y” or “N” indicates whether or not both IPv4 and IPv6 addressing modes are supported.</li> <li>A—Alternative Provisioning Mode (APM), where “Y” or “N” indicates whether or not APM is supported.</li> </ul> <p><b>Note</b> APM is not supported by the Cisco CMTS routers in Cisco IOS Release 12.2(33)SCA.</p> |
| IPv4 address | <p>IPv4 address acquired by the CM. Prior to acquisition of the IP address, or if the CM fails IPv4 registration, the following output is shown:</p> <ul style="list-style-type: none"> <li>IPv4 address not yet acquired—“0.0.0.0”</li> <li>CM fails IPv4 registration, but online with IPv6 address: “_”</li> <li>IPv4 address of an IPv6-only CM: “_”</li> </ul>                                                                                                                                                                                                           |
| IPv6 Address | <p>IPv6 address acquired by the CM. Prior to acquisition of the IP address, or if the CM fails IPv6 registration, the following output is shown:</p> <ul style="list-style-type: none"> <li>IPv6 address not yet acquired—“::”</li> <li>CM fails IPv6 registration, but online with IPv4 address “_”</li> <li>IPv6 address of IPv4-only CM: “_”</li> </ul>                                                                                                                                                                                                                    |

**Related Commands**

| Command                          | Description                                                   |
|----------------------------------|---------------------------------------------------------------|
| <b>show cable modem</b>          | Displays information for the registered and unregistered CMs. |
| <b>show cable modem rf-adapt</b> | Displays RF adaptation information for cable modems.          |

# show cable modem unregistered

To display a list of the cable modems (CMs) that are marked as unregistered with the Cisco CMTS, use the **show cable modem unregistered** command in privileged EXEC mode.

## Cisco uBR7100 Series and Cisco uBR7200 Series Routers

```
show cable modem [ip-address | mac-address | cable {slot/port | slot/cable-interface-index}
[upstream port [logical-channel-index]] | name fqdn] unregistered
```

## Cisco uBR10012 Router

```
show cable modem [ip-address | mac-address | cable {slot/subslot/port |
slot/subslot/cable-interface-index} [upstream port [logical-channel-index]] | name fqdn]
unregistered
```

### Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>            | (Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                       |
| <i>mac-address</i>           | (Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                                                                                                                               |
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                      |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |

|                              |                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>upstream port</b>         | (Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card. |
| <b>logical-channel-index</b> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                  |
| <b>name fqdn</b>             | (Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the <b>show cable modem domain-name</b> command has been run for the first time to update the cable DNS cache on the CMTS router.                                                             |

**Defaults**

Displays a list of all unregistered CMs on the Cisco CMTS router.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 12.2(4)BC1  | This command was introduced on the Cisco uBR10012 router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>• Support for the Cisco uBR7225VXR router was added.</li> <li>• Support for specifying the IPv6 address of a CM or CPE device was added.</li> <li>• The <b>name</b> keyword option was added for specifying the fully-qualified domain name of a CM.</li> <li>• The following new initialization states were added to show initialization of CMs and CPEs supporting IPv6: <ul style="list-style-type: none"> <li>– init6(s)—CMTS router has seen SOLICIT message.</li> <li>– init6(a)—CMTS router has seen ADVERTISE message.</li> <li>– init6(r)—CMTS router has seen REQUEST message.</li> <li>– init6(i)—CMTS router has seen REPLY message.</li> <li>– init6(o)—CMTS router has seen version 6 TFTP request.</li> <li>– init6(t)—CMTS router has seen version 6 TOD request.</li> </ul> </li> </ul> |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

**Usage Guidelines****Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration**

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the **show cable modem ip-address** command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the **ping ip-address** command, and then the **show cable modem ip-address** command will show the cable modem. You can also display any particular cable modem by using the **show cable modem | include ip-address** command.

In addition, when HCCP redundancy has been configured, the Cisco IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the **hccp resync** command. When a SYNC event command is occurring, CLI commands might be very slow to respond. In particular, if you enter the **show cable modem** command at the same time a SYNC event is occurring, the command might respond produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Note**

In Cisco IOS Release 12.2(33)SCA, the **show cable modem domain-name** command must be run first on the route processor (RP) of the CMTS router before any domain name can be used as part of a cable command.

**Examples**

The following example shows sample output for the default form of the **show cable modem unregistered** command.

```
Router# show cable modem unregistered
```

| Interface   | Prim<br>Sid | Online<br>State | Timing<br>Offset | Rec<br>Power | QoS | CPE | IP address | MAC address    |
|-------------|-------------|-----------------|------------------|--------------|-----|-----|------------|----------------|
| Cable3/0/U0 | 1           | online          | 2812             | -0.25        | 5   | 1   | 3.18.1.5   | 0030.80bc.2303 |
| Cable3/0/U0 | 2           | online          | 2804             | 0.50         | 5   | 0   | 3.18.1.9   | 0006.2854.73f5 |
| C6/0/U0     | 6           | init6(i)        | 1532             | -0.50        | 2   | 0   | 0.0.0.0    | 0018.6835.27dd |

The following example shows sample output for the **show cable modem unregistered** command for a particular cable interface:

```
Router# show cable modem c8/1/0 unregistered
```

| Interface | Prim<br>Sid | Online<br>State | Timing<br>Offset | Rec<br>Power | QoS | CPE | IP address | MAC address    |
|-----------|-------------|-----------------|------------------|--------------|-----|-----|------------|----------------|
| C8/1/0/U1 | 1           | online          | 1548             | 0.00         | 5   | 0   | 22.1.1.11  | 0050.7366.1243 |
| C8/1/0/U4 | 2           | online          | 1925             | 0.00         | 5   | 0   | 23.1.1.10  | 0002.b970.0027 |
| C8/1/0/U4 | 3           | online          | 1918             | -0.50        | 2   | 0   | 22.1.1.10  | 0006.5314.858d |

The following example shows sample output for the **show cable modem unregistered** command for a single CM, as identified by its IP address:

```
Router# show cable modem 22.1.1.10 unregistered
```

| Interface | Prim | Online | Timing | Rec   | QoS | CPE | IP address | MAC address    |
|-----------|------|--------|--------|-------|-----|-----|------------|----------------|
|           | Sid  | State  | Offset | Power |     |     |            |                |
| C8/1/0/U4 | 3    | online | 1918   | -0.75 | 2   | 0   | 22.1.1.10  | 0006.5314.858d |

The following example shows sample output for the **show cable modem unregistered** command for a single CM, as identified by its MAC address:

```
Router# show cable modem 0006.5314.858d unregistered
```

| Interface | Prim | Online | Timing | Rec   | QoS | CPE | IP address | MAC address    |
|-----------|------|--------|--------|-------|-----|-----|------------|----------------|
|           | Sid  | State  | Offset | Power |     |     |            |                |
| C8/1/0/U4 | 3    | online | 1918   | -0.25 | 2   | 0   | 22.1.1.10  | 0006.5314.858d |



#### Note

An asterisk (\*) in the Receive Power column indicates that a power adjustment has been made for that CM. An exclamation point (!) in the Receive Power column indicates that the CM has reached its maximum power transmit level and cannot increase its power level further. An exclamation point (!) in the Timing Offset column indicates that the CM has exceeded the maximum delay and timing offset specified by the **cable map-advance** command.

A pound sign (#) in the MAC State column indicates that the **cable tftp-enforce mark-only** command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so (Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases).



#### Tip

The **show cable modem** command displays the CM timing offset in DOCSIS ticks, while other commands, such as **cable map-advance**, display the offset in microseconds. Use the following method to convert microseconds to DOCSIS ticks:  $\text{ticks} = \text{microseconds} * 64 / 6.25$ .

Table 130 describes the major fields shown in the **show cable modem unregistered** displays:

**Table 130** Descriptions for the show cable modem unregistered Fields

| Field        | Description                                                       |
|--------------|-------------------------------------------------------------------|
| Interface    | The cable interface line card providing the upstream for this CM. |
| Prim SID     | The primary SID assigned to this CM.                              |
| Online State | The current state of the MAC layer (see Table 107).               |

**Table 130** Descriptions for the show cable modem unregistered Fields (continued)

| Field         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Timing Offset | <p>The timing offset for the CM, in ticks, as recognized on the CMTS. (A tick, as used here, is 6.25/64 microseconds.) This is the delay between when a particular cable modem is scheduled to make a transmission and when the CMTS actually receives it.</p> <p><b>Note</b> An exclamation point (!) in the Timing Offset column indicates that the CM has exceeded the maximum delay and timing offset specified by the <b>cable map-advance</b> command.</p> <p><b>Note</b> The timing offset shown here is typically smaller than the TX Time Offset value shown by the <b>show cable modem remote-query</b> command, because the latter value is the offset as recognized on the CM (which will include any internal delay between when the CM software begins the transmission and when the bits actually appear on the local cable interface).</p> |
| Rec Power     | <p>The received power level (in dB) for the CM.</p> <p><b>Note</b> An asterisk (*) in the RxPwr column indicates that a power adjustment has been made for that CM. An exclamation point (!) indicates that the CM has reached its maximum power transmit level and cannot increase its power level further.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| QoS           | Displays the QoS profile assigned to the CM (DOCSIS 1.1 and DOCSIS 2.0 CMs only).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CPE           | Indicates the number of CPE devices for which the CM is providing services.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| IP Address    | The IP address that the DHCP server has assigned to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MAC Address   | The MAC address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 107 shows the possible values for the Online State field:

**Table 131** Descriptions for the Online State Field <sup>1</sup>

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Registration and Provisioning Status Conditions for Devices Using IPv4 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| init(r1)                                                                                 | The CM sent initial ranging.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| init(r2)                                                                                 | The CM is ranging. The CMTS received initial ranging from the Cm and has sent RF power, timing offset, and frequency adjustments to the CM.                                                                                                                                                                                                                                                                                                                                 |
| init(rc)                                                                                 | <p>Ranging has completed.</p> <p><b>Note</b> If a CM appears to be stuck in this state, it could be that the CM is able to communicate successfully on the cable network, but that the upstream is at capacity and does not have any additional bandwidth to allow the CM to finish registration and come online. Either manually move one or more CMs to other upstreams, or enable load balancing on the upstream using the <b>cable load-balance group</b> commands.</p> |
| init(d)                                                                                  | The DHCP request was received, as DHCPDISCOVER. This also indicates that the first IP broadcast packet has been received from the CM.                                                                                                                                                                                                                                                                                                                                       |
| init(dr)                                                                                 | The DHCP request has been sent to the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table 131** Descriptions for the Online State Field (continued)<sup>1</sup>

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| init(i)                                                                                  | The cable modem has received the DHCPOFFER reply (DHCPACK) from the DHCP server that has assigned an IP address to the modem, but the modem has not yet replied with a DHCPREQUEST message requesting that particular IP address, nor has it sent an IP packet with that IP address.<br><br><b>Note</b> If a CM appears to be stuck in this state, the CM has likely received the DHCPOFFER reply from the DHCP server, but this reply might have contained one or more invalid options for that particular CM. |
| init(io)                                                                                 | The Cisco CMTS has seen the DHCP offer as sent to the cable modem from the DHCP server that has assigned an IP address to the modem.                                                                                                                                                                                                                                                                                                                                                                            |
| init(o)                                                                                  | The CM has begun to download the option file (DOCSIS configuration file) using the Trivial File Transfer Protocol (TFTP), as specified in the DHCP response. If the CM remains in this state, it indicates that the download has failed.                                                                                                                                                                                                                                                                        |
| init(t)                                                                                  | Time-of-day (TOD) exchange has started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| resetting                                                                                | The CM is being reset and will shortly restart the registration process.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Registration and Provisioning Status Conditions for Devices Using IPv6 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| init6(s)                                                                                 | The Cisco CMTS router has seen the DHCPv6 SOLICIT message from the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| init6(a)                                                                                 | The Cisco CMTS router has seen the ADVERTISE message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| init6(r)                                                                                 | The Cisco CMTS router has seen the REQUEST response from the CM to the DHCPv6 server.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| init6(i)                                                                                 | The Cisco CMTS router has seen the REPLY message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init6(o)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TFTP server.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init6(t)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TOD server.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Non-error Status Conditions</b>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| cc(r1)                                                                                   | The CM had registered and was online, but has received a Downstream Channel Change (DCC) or Upstream Channel Change (UCC) request message from the CMTS. The CM has begun moving to the new channel, and the CMTS has received the CM's initial ranging on the new downstream or upstream channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                             |
| cc(r2)                                                                                   | This state should normally follow cc(r1) and indicates that the CM has finished its initial ranging on the new channel, and is currently performing continuous ranging on the new channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                                                                                                     |
| offline                                                                                  | The CM is considered offline (disconnected or powered down).                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| online                                                                                   | The CM has registered and is enabled to pass data on the network.                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Table 131** Descriptions for the Online State Field (continued)<sup>1</sup>

| MAC State Value                                                                                                                                                                                                                                                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| online(d)                                                                                                                                                                                                                                                                                              | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. The CM does not forward traffic to or from the CPE devices, but the CMTS can continue to communicate with the CM using DOCSIS messages and IP traffic (such as SNMP commands).</p> <p><b>Note</b> If BPI was enabled in the DOCSIS configuration file sent to the CM, assume that the CM is using BPI encryption, unless other messages show that the BPI negotiation and key assignments have failed.</p> |
| online(pkd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and KEK is assigned.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pk) states.</p>                                                                                                                                                                                                                                                                   |
| online(ptd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pt) states.</p>                                                                                                                                                                                                                            |
| online(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| online(pt)                                                                                                                                                                                                                                                                                             | <p>The CM registered, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> If network access was disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) instead of online(pt) even when BPI encryption is enabled and operational.</p>                                                                                                                                                                  |
| <p><b>Note</b> If an exclamation point (!) appears in front of one of the online states, it indicates that the <b>cable dynamic-secret</b> command has been used with either the <b>mark</b> or <b>reject</b> option, and that the cable modem has failed the dynamic secret authentication check.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| expire(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                   |
| expire(pkd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pk) states.</p>                                                                                                                                                                                 |
| expire(pt)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                   |
| expire(ptd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pt) states.</p>                                                                                                                                                                                 |



**Table 131** Descriptions for the Online State Field (continued)<sup>1</sup>

| MAC State Value                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Error Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| reject(m)                      | <p>The CM attempted to register but registration was refused due to a bad Message Integrity Check (MIC) value. This also could indicate that the shared secret in the DOCSIS configuration file does not match the value configured on the CMTS with the <b>cable shared-secret</b> command.</p> <p>In Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases, this could also indicate that the <b>cable tftp-enforce</b> command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so.</p>                                                                                                                                                                                                                   |
| reject(c)                      | <p>The CM attempted to register, but registration was refused due to a number of possible errors:</p> <ul style="list-style-type: none"> <li>• The CM attempted to register with a minimum guaranteed upstream bandwidth that would exceed the limits imposed by the <b>cable upstream admission-control</b> command.</li> <li>• The CM has been disabled because of a security violation.</li> <li>• A bad class of service (COS) value in the DOCSIS configuration file.</li> <li>• The CM attempted to create a new COS configuration but the CMTS is configured to not permit such changes.</li> <li>• The CM failed the timestamp check for its DOCSIS configuration file. (This could indicate a possible theft-of-service attempt, or a problem with the synchronization of the clocks on the CM and CMTS.)</li> </ul> |
| reject(pk)                     | KEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(pkd)                    | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pk) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| reject(pt)                     | TEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(ptd)                    | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>                    | <p>In Cisco IOS Release 12.1(20)EC, Cisco IOS Release 12.2(15)BC1, and earlier releases, when network access is disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) even if BPI encryption fails. Use the <b>show cable modem mac-address</b> command to confirm whether BPI is enabled or disabled for a particular cable modem.</p>                                                                                                                                                                                                                                                                                                                                                                                            |
| reject(ts)                     | The CM attempted to register, but registration failed because the TFTP server timestamp in the CM registration request did not match the timestamp maintained by the CMTS. This might indicate that the CM attempted to register by replaying an old DOCSIS configuration file used during a prior registration attempt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Table 131** Descriptions for the Online State Field (continued)<sup>1</sup>

| MAC State Value | Description                                                                                                                                                                                                                                                           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| reject(ip)      | The CM attempted to register, but registration failed because the IP address in the CM request did not match the IP address that the TFTP server recorded when it sent the DOCSIS configuration file to the CM. IP spoofing could be occurring.                       |
| reject(na)      | The CM attempted to register, but registration failed because the CM did not send a Registration-Acknowledgement (REG-ACK) message in reply to the Registration-Response (REG-RSP) message sent by the CMTS. A Registration-NonAcknowledgement (REG-NACK) is assumed. |

1. The CM MAC state field can also be retrieved using SNMP by getting the value of the cdxCmtsCmStatusValue object in the CISCO-DOCS-EXT-MIB.

**Related Commands**

| Command                              | Description                                                                                             |
|--------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>cable modem vendor</b>            | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                        |
| <b>show cable modem</b>              | Displays information for the registered and unregistered CMs.                                           |
| <b>show cable modem access-group</b> | Displays the access groups for the CMs on a particular cable interface.                                 |
| <b>show cable modem classifiers</b>  | Displays information about the classifiers for a particular CM.                                         |
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                                                   |
| <b>show cable modem cpe</b>          | Displays the CPE devices accessing the cable interface through a particular CM.                         |
| <b>show cable modem offline</b>      | Displays a list of the CMs that are marked as offline with the Cisco CMTS.                              |
| <b>show cable modem registered</b>   | Displays a list of the CMs that are marked as registered with the Cisco CMTS.                           |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                                                    |
| <b>show cable modem vendor</b>       | Displays the vendor name or Organizational Unique Identifier (OUI) for the CMs on each cable interface. |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.                           |
| <b>show interface cable sid</b>      | Displays cable interface information.                                                                   |

# show cable modem vendor

To display the vendor name or Organizational Unique Identifier (OUI) for the CMs on each cable interface, use the **show cable modem vendor** command in privileged EXEC mode.

**show cable modem** [**cable** {*slot/subslot/port* | *slot/subslot/cable-interface-index*} [**upstream port** [*logical-channel-index*]]] **vendor** [**summary**]

|                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>slot</i>                  | Slot where the line card resides. The valid range is from 5 to 8.                                                                                                                                                                                                                                                                                                                                |
|                    | <i>subslot</i>               | Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                           |
|                    | <i>port</i>                  | Downstream port number. The valid range is from 0 to 4 (depending on the cable interface).                                                                                                                                                                                                                                                                                                       |
|                    | <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"><li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li></ul> |
|                    | <b>upstream port</b>         | (Optional) Displays information for all CMs using this specific upstream. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports on the cable interface line card.                                                                                 |
|                    | <i>logical-channel-index</i> | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                                                                                   |
|                    | <b>summary</b>               | (Optional) Displays the total numbers for each vendor and OUI, along with the total numbers of those vendor's CMs that are currently registered with the CMTS, unregistered, or offline.                                                                                                                                                                                                         |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

| Command History | Release     | Modification                                                                                                |
|-----------------|-------------|-------------------------------------------------------------------------------------------------------------|
|                 | 12.2(8)BC2  | This command was introduced for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers. |
|                 | 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .          |
|                 | 12.2(33)SCF | This command was modified. The <i>logical-channel-index</i> argument was added.                             |

|                  |                                                                                                                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command displays the vendor name for each CM. If the vendor name has not been defined by the <b>cable modem vendor</b> command, the command displays the OUI value for the modem's vendor. |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Note**

The Institute of Electrical and Electronics Engineers (IEEE) is the official issuer of OUI values. The IEEE OUI web site is at <http://standards.ieee.org/regauth/oui/index.shtml>.

**Note**

Also see the information about this command's behavior in a Hot Standby Connection-to-Connection Protocol (HCCP) configuration.

**Examples**

The following example shows typical output for the **show cable modem vendor** command:

Router# **show cable modem vendor**

| Vendor   | MAC Address    | I/F     | MAC State | Prim Sid | RxPwr (db) | Timing Offset | Num CPE | BPI Enb |
|----------|----------------|---------|-----------|----------|------------|---------------|---------|---------|
| Cisco    | 0001.9659.519f | C1/0/U0 | init(rc)  | 16       | 0.75       | 2738          | 0       | N       |
| Cisco    | 0002.b96f.fdbb | C1/0/U0 | online    | 20       | 1.00       | 2738          | 1       | N       |
| Cisco    | 0002.b96f.fdf9 | C1/0/U0 | online    | 21       | 0.50       | 2737          | 1       | N       |
| Cisco    | 0002.b96f.fff7 | C1/0/U0 | online    | 12       | 0.50       | 2737          | 1       | N       |
| Cisco    | 0002.fdfa.1163 | C1/0/U0 | online    | 1        | 0.00       | 2734          | 1       | N       |
| Cisco    | 0002.fdfa.12d5 | C1/0/U0 | online    | 14       | 0.00       | 2737          | 1       | N       |
| Cisco    | 0002.fdfa.12db | C1/0/U0 | online    | 18       | 0.25       | 2736          | 1       | N       |
| Cisco    | 0002.fdfa.12e9 | C1/0/U0 | online    | 13       | 0.25       | 2737          | 1       | N       |
| Cisco    | 0006.28dc.37fd | C1/0/U0 | offline   | 7        | 0.25       | 2734          | 0       | N       |
| Cisco    | 0006.28e9.81c9 | C1/0/U0 | online    | 2        | 0.75       | 2735          | 1       | N       |
| Motorola | 0020.28f9.9d19 | C1/0/U0 | online    | 28       | -0.25      | 2733          | 1       | N       |
| Motorola | 0020.4006.b010 | C1/0/U0 | online    | 19       | 0.00       | 2728          | 1       | N       |
| 00.C0.FF | 00c0.FF78.8bea | C1/0/U0 | offline   | 10       | 1.25       | 2732          | 0       | N       |
| Cisco    | 00b0.6478.ae8d | C1/0/U0 | offline   | 10       | 1.50       | 2735          | 0       | N       |
| Cisco    | 00d0.bad3.c0cd | C1/0/U0 | online    | 26       | 0.25       | 2214          | 1       | N       |
| Cisco    | 00d0.bad3.c0d5 | C1/0/U0 | online    | 27       | 0.00       | 2215          | 1       | N       |

Router#

The following example shows typical output for the **show cable modem vendor** command on the Cisco uBR10012 router:

Router# **show cable modem vendor**

| Vendor   | MAC Address    | I/F       | MAC State | Prim Sid | RxPwr (db) | Timing Offset | Num CPE | BPI Enb |
|----------|----------------|-----------|-----------|----------|------------|---------------|---------|---------|
| Thomson  | 0010.9507.01db | C5/1/0/U5 | online    | 1        | 0.00       | 938           | 1       | N       |
| Ericsson | 0080.37b8.e99b | C5/1/0/U5 | online    | 2        | -0.25      | 1268          | 0       | N       |
| Cisco    | 0002.fdfa.12ef | C6/1/0/U0 | online    | 13       | 0.00       | 1920          | 1       | N       |
| Cisco    | 0002.fdfa.137d | C6/1/0/U0 | online    | 16       | -0.50      | 1920          | 1       | N       |
| Cisco    | 0003.e38f.e9ab | C6/1/0/U0 | online    | 3        | -0.25      | 1926          | 1       | N       |
| Cisco    | 0003.e3a6.7f69 | C6/1/0/U0 | online    | 15       | 0.50       | 1927          | 1       | N       |
| Cisco    | 0003.e3a6.816d | C6/1/0/U0 | online    | 4        | 0.00       | 1929          | 1       | N       |
| Cisco    | 0006.28f9.8be5 | C6/1/0/U0 | online    | 12       | 0.75       | 1922          | 1       | N       |
| Cisco    | 0001.9659.519f | C6/1/1/U2 | online    | 26       | 0.25       | 1930          | 1       | N       |
| Cisco    | 0002.b96f.fdbb | C6/1/1/U2 | online    | 29       | -0.75      | 1929          | 1       | N       |
| Cisco    | 0002.b96f.fdf9 | C6/1/1/U2 | online    | 39       | -0.50      | 1931          | 1       | N       |
| Cisco    | 0002.b96f.fff7 | C6/1/1/U2 | online    | 38       | 0.00       | 1928          | 1       | N       |
| Cisco    | 0002.fdfa.1163 | C6/1/1/U2 | online    | 15       | 0.00       | 1923          | 1       | N       |
| Cisco    | 0002.fdfa.12d5 | C6/1/1/U2 | online    | 35       | 0.25       | 1923          | 1       | N       |
| Cisco    | 0002.fdfa.12e9 | C6/1/1/U2 | online    | 5        | -0.25      | 1925          | 1       | N       |
| Cisco    | 0050.7302.3d73 | C6/1/1/U2 | online    | 58       | 0.25       | 1553          | 1       | N       |
| Cisco    | 0002.fdfa.12db | C7/0/0/U0 | online    | 15       | -0.75      | 1914          | 1       | N       |
| Cisco    | 0002.fdfa.138d | C7/0/0/U5 | online    | 4        | 0.25       | 1917          | 1       | N       |
| Cisco    | 0003.e38f.e85b | C7/0/0/U5 | online    | 17       | 0.25       | 1919          | 1       | N       |

```

Cisco 0003.e38f.f4cb C7/0/0/U5 online 16 0.00 1922 1 N
Cisco 0003.e3a6.7fd9 C7/0/0/U5 online 1 0.25 1922 0 N
Motorola 0020.4005.3f06 C7/0/0/U0 online 2 0.00 1901 1 N
Motorola 0020.4006.b010 C7/0/0/U5 online 3 0.25 1901 1 N
Cisco 0050.7302.3d83 C7/0/0/U0 online 18 -0.25 1543 1 N
Cisco 00b0.6478.ae8d C7/0/0/U5 online 44 0.50 1920 21 N
Cisco 00d0.bad3.c0cd C7/0/0/U5 online 19 0.00 1543 1 N
Cisco 00d0.bad3.c0cf C7/0/0/U0 online 13 0.00 1546 1 N
Cisco 00d0.bad3.c0d5 C7/0/0/U0 online 12 -0.50 1546 1 N

```

Router#



Tip

The **show cable modem vendor** command displays the CM timing offset in DOCSIS ticks, while other commands, such as **cable map-advance**, display the offset in microseconds. Use the following method to convert microseconds to DOCSIS ticks: `ticks = microseconds*64/6.25`.

Table 0-132 describes the major fields shown in the **show cable modem vendor** displays:

**Table 0-132** Descriptions for the show cable modem vendor Fields

| Field         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vendor        | The vendor name for the indicated CM, as specified by the <b>cable modem vendor</b> command. If no name for this vendor has been specified, displays the modem's OUI value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MAC Address   | The MAC address for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| I/F           | The cable interface line card providing the upstream for this CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| MAC State     | The current state of the MAC layer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Prim SID      | The primary SID assigned to this CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| RxPwr         | <p>The received power level (in dB) for the CM.</p> <p><b>Note</b> An asterisk (*) in the RxPwr column indicates that a power adjustment has been made for that CM. An exclamation point (!) indicates that the CM has reached its maximum power transmit level and cannot increase its power level further.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Timing Offset | <p>The timing offset for the CM, in ticks, as recognized on the CMTS. (A tick, as used here, is 6.25/64 microseconds.) This is the delay between when a particular cable modem is scheduled to make a transmission and when the CMTS actually receives it.</p> <p><b>Note</b> An exclamation point (!) in the Timing Offset column indicates that the CM has exceeded the maximum delay and timing offset specified by the <b>cable map-advance</b> command.</p> <p><b>Note</b> The timing offset shown here is typically smaller than the TX Time Offset value shown by the <b>show cable modem remote-query</b> command, because the latter value is the offset as recognized on the CM (which will include any internal delay between when the CM software begins the transmission and when the bits actually appear on the local cable interface).</p> |
| Num CPE       | Indicates the number of CPE devices for which the CM is providing services.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| BPI Enbld     | Indicates whether Baseline Privacy Interface (BPI) or BPI Plus (BPI+) encryption is enabled for the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Note**

An asterisk (\*) in the RxPwr column indicates that a power adjustment has been made for that CM. An exclamation point (!) in the Receive Power column indicates that the CM has reached its maximum power transmit level and cannot increase its power level further. An exclamation point (!) in the Timing Offset column indicates that the CM has exceeded the maximum delay and timing offset specified by the **cable map-advance** command.

A pound sign (#) in the MAC State column indicates that the **cable tftp-enforce mark-only** command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so (Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases).

The following example shows typical output for the **show cable modem vendor summary** command, displaying the total numbers for each vendor and OUI, along with the total numbers of those vendor's CMs that are currently registered with the CMTS, unregistered, or offline.

Router# **show cable modem vendor summary**

| Vendor   | OUI      | Cable Modem |            |              |         |
|----------|----------|-------------|------------|--------------|---------|
|          |          | Total       | Registered | Unregistered | Offline |
| 00.02.B2 | 00.02.B2 | 4288        | 3997       | 291          | 259     |
| 00.0A.73 | 00.0A.73 | 4105        | 3938       | 167          | 108     |
| 00.0B.06 | 00.0B.06 | 1060        | 1001       | 59           | 48      |
| 00.40.7B | 00.40.7B | 216         | 211        | 5            | 2       |
| 00.50.04 | 00.50.04 | 701         | 684        | 17           | 15      |
| 00.50.DA | 00.50.DA | 737         | 706        | 31           | 26      |
| 00.D0.DD | 00.D0.DD | 2           | 0          | 2            | 2       |
| 3Com     | 00.01.03 | 669         | 645        | 24           | 21      |
| 3Com     | 00.04.75 | 10          | 10         | 0            | 0       |
| Ambit    | 00.D0.59 | 1           | 1          | 0            | 0       |
| BestData | 00.E0.CA | 1           | 1          | 0            | 0       |
| Cisco    | 00.04.C1 | 1           | 1          | 0            | 0       |
| LinkSys  | 00.06.25 | 15          | 13         | 2            | 2       |
| Motorola | 00.04.BD | 705         | 676        | 29           | 21      |
| Motorola | 00.08.0E | 762         | 734        | 28           | 16      |
| Motorola | 00.20.40 | 1504        | 1444       | 60           | 45      |
| Powercom | 00.30.3B | 3           | 2          | 1            | 1       |
| SMC      | 00.04.E2 | 1           | 1          | 0            | 0       |
| Terayon  | 00.E0.6F | 652         | 612        | 40           | 25      |
| Thomson  | 00.10.95 | 127         | 121        | 6            | 5       |
| Toshiba  | 00.00.39 | 1           | 1          | 0            | 0       |
| Turbo    | 00.90.83 | 4           | 4          | 0            | 0       |
| Zoom     | 00.40.36 | 1           | 1          | 0            | 0       |

Router#

**Tip**

You can add a timestamp to this command using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                   | Description                                                                      |
|---------------------------|----------------------------------------------------------------------------------|
| <b>cable modem vendor</b> | Associates the name of a vendor with its Organizational Unique Identifier (OUI). |
| <b>show cable modem</b>   | Displays information for the registered and unregistered CMs.                    |

| Command                              | Description                                                                     |
|--------------------------------------|---------------------------------------------------------------------------------|
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                           |
| <b>show cable modem cpe</b>          | Displays the CPE devices accessing the cable interface through a particular CM. |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                     |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                            |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.   |
| <b>show interface cable sid</b>      | Displays cable interface information.                                           |

# show cable modem voice

To show the detected voice-enabled modems, use the **show cable modem voice** command.

**show cable modem voice [pending|failed]**

|                    |                |                                                                                                                                   |
|--------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>pending</b> | (Optional) Displays cable modems that are being moved to the target channel via Downstream Frequency Override (DFO).              |
|                    | <b>failed</b>  | (Optional) Displays cable modems that have already reached the maximum Downstream Frequency Override retry limit without success. |

|                 |                               |
|-----------------|-------------------------------|
| Command Default | No default behavior or values |
|-----------------|-------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |                |                                                            |
|-----------------|----------------|------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                        |
|                 | 12.3(23)BC     | This command was introduced for the Cisco uBR10012 router. |

|                  |                                                                |
|------------------|----------------------------------------------------------------|
| Usage Guidelines | Use this command to display the detected voice-enabled modems. |
|------------------|----------------------------------------------------------------|



|      |                                                                                                                                  |
|------|----------------------------------------------------------------------------------------------------------------------------------|
| Note | The <b>show cable modem voice</b> command is not supported on the Cisco uBR-MC28U line card on the Cisco uBR7200 series routers. |
|------|----------------------------------------------------------------------------------------------------------------------------------|

|          |                                |            |           |            |      |     |            |      |  |
|----------|--------------------------------|------------|-----------|------------|------|-----|------------|------|--|
| Examples | Router# show cable modem voice |            |           |            |      |     |            |      |  |
|          | MAC Address                    | IP Address | Host      | MAC        | Prim | Num | Primary    | DS   |  |
|          |                                |            | Interface | State      | Sid  | CPE | Downstream | RfId |  |
|          | 0013.10bb.22f9                 | 80.17.1.2  | C6/0/0/U0 | online(pt) | 2    | 0   | Mo3/0/0:1  | 1    |  |
|          | 0013.10bb.23d1                 | 80.17.1.5  | C6/0/1/U1 | online(pt) | 5    | 0   | C6/0/1     | 255  |  |

|                  |                                                 |                                                                             |
|------------------|-------------------------------------------------|-----------------------------------------------------------------------------|
| Related Commands | <b>show cable service-voice downstream-type</b> | Displays the downstream-types that are capable of providing voice services. |
|------------------|-------------------------------------------------|-----------------------------------------------------------------------------|



# show cable modem wideband

To display information for registered and unregistered wideband CMs, use the **show cable modem wideband** command in privileged EXEC mode.

**show cable modem wideband** [**registered-traditional-docsis** | **channel** ]

**show cable modem** [*ip-address* | *mac-address* | **cable** { *slot/subslot/port* | *slot/subslot/cable-interface-index* } [**upstream port** [*logical-channel-index*]]] **wideband** [**channel**]

| Syntax Description                   |  |                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>                    |  | (Optional) Identifies the IP address of a specific wideband CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.                                                                                                                                                                                                                  |
| <i>mac-address</i>                   |  | (Optional) Identifies the MAC address of a specific wideband CM to be displayed. If you specify the MAC address for a CPE device behind a wideband CM, information for that wideband CM is displayed.                                                                                                                                                                                              |
| <i>slot</i>                          |  | Slot where the line card resides. The valid range is from 5 to 8.                                                                                                                                                                                                                                                                                                                                  |
| <i>subslot</i>                       |  | Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                             |
| <i>port</i>                          |  | Downstream port number. The valid range is from 0 to 4 (depending on the cable interface).                                                                                                                                                                                                                                                                                                         |
| <i>cable-interface-index</i>         |  | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <b>upstream port</b>                 |  | (Optional) Displays information for all CMs using this specific upstream. You can specify this option only when displaying information for a cable interface. The valid range for <i>port</i> begins with 0 and ends with a value that depends on the number of upstream ports on the cable interface line card.                                                                                   |
| <i>logical-channel-index</i>         |  | (Optional) Logical channel index. The valid values are 0 or 1.                                                                                                                                                                                                                                                                                                                                     |
| <b>registered-traditional-docsis</b> |  | (Optional) Displays information for wideband CMs that are currently registered as traditional DOCSIS modems.                                                                                                                                                                                                                                                                                       |
| <b>channel</b>                       |  | (Optional) Displays the number of downstream (DS) and upstream (US) channels used by a cable modem.                                                                                                                                                                                                                                                                                                |

**Command Modes** Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                                                          |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 universal broadband router.                                                                                                                                        |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                                                       |
| 12.2(33)SCB | This command output no longer shows the downstream (DS) channel ID or the bonding group (BG) ID. A new column was added to display the Receive Channel Configuration (RCC) ID of the RCC assigned to the cable modem. |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> .                                                                                                                    |
| 12.2(33)SCF | This command was modified. The <b>channel</b> keyword and <i>logical-channel-index</i> argument was added.                                                                                                            |
| 12.2(33)SCG | This command output was modified to display direct downstream and upstream channel information on downstream channel bonding (DSCB) and upstream channel bonding (USCB) partial services.                             |

## Usage Guidelines

This command displays information for a one or more wideband CMs. Optionally, the CMs for which to display information can be identified IP address, MAC address, or cable interface.

If a wideband-capable CM is not able to register as a wideband CM (for example, if no wideband channel is available), the CM attempts to register as a traditional DOCSIS modem. The **registered-traditional-docsis** keyword limits the set of wideband CMs for which to display information to wideband-capable CMs that are currently registered as DOCSIS 1.X or DOCSIS 2.0 modems.

## Examples

#### Example of the show cable modem wideband Command in a Cisco IOS Release Prior to Cisco IOS Release 12.2(33)SCB

The following is a sample output for the default form of the **show cable modem wideband** command on a Cisco uBR10012 router running a Cisco IOS Release prior to Cisco IOS Release 12.2(33)SCB:

Router# **show cable modem wideband**

| MAC Address    | IP Address | I/F       | MAC State    | Prim Sid | BGDSID ID | MD-DS-SG |
|----------------|------------|-----------|--------------|----------|-----------|----------|
| 0014.bfbe.3cc0 | 1.11.0.1   | C5/0/1/U0 | w-online(pt) | 3        | 24        | 24 N/A   |
| 0016.92f0.90d6 | 1.11.0.4   | C5/0/1/U0 | w-online(pt) | 5        | 24        | 272 1    |
| 0014.bfbe.3cb8 | 1.11.0.2   | C6/0/1/U0 | w-online(pt) | 3        | 36        | 36 N/A   |
| 0016.92f0.90d8 | 1.11.0.3   | C6/0/1/U0 | w-online(pt) | 5        | 36        | 274 1    |

#### Example of the show cable modem wideband Command in Cisco IOS Release 12.2(33)SCB

The following is a sample output for the default form of the **show cable modem wideband** command on a Cisco uBR10012 router running Cisco IOS Release 12.2(33)SCB:

Router# **show cable modem wideband**

| MAC Address    | IP Address | I/F       | MAC State    | Prim Sid | RCC ID | MD-DS-SG |
|----------------|------------|-----------|--------------|----------|--------|----------|
| 0014.bfbe.4694 | 30.2.0.3   | C8/0/0/U0 | w-online(pt) | 3        | 1      | 1        |
| 0018.6852.84aa | 30.2.0.5   | C8/0/0/U0 | w-online(pt) | 4        | 2      | 1        |



## Note

The RCC ID refers to the output of the **show cable mac-domain rcc** command.

**Examples of the show cable modem wideband channel Command in Cisco IOS Release 12.2(33)SCF**

The following is a sample output of the **show cable modem wideband channel** command for all cable modems:

```
Router# show cable modem wideband channel
```

| MAC Address    | IP Address | I/F       | MAC State | DSxUS | Primary WB |
|----------------|------------|-----------|-----------|-------|------------|
| 0018.6852.7b76 | 80.62.0.5  | C6/1/0/U0 | w-online  | 2x1   | Wi6/1/0:1  |
| 0019.474a.c182 | 80.62.0.2  | C6/1/0/U0 | w-online  | 2x1   | Wi6/1/0:1  |

The following is a sample output of the **show cable modem wideband channel** command for a specific cable modem identified by its IP address:

```
Router# show cable modem 80.62.0.5 wideband channel
```

| MAC Address    | IP Address | I/F       | MAC State | DSxUS | Primary WB |
|----------------|------------|-----------|-----------|-------|------------|
| 0018.6852.7b76 | 80.62.0.5  | C6/1/0/U0 | w-online  | 2x1   | Wi6/1/0:1  |

The following is a sample output of the **show cable modem wideband channel** command for a specific cable modem identified by its MAC address:

```
Router# show cable modem 0018.6852.7b76 wideband channel
```

| MAC Address    | IP Address | I/F       | MAC State | DSxUS | Primary WB |
|----------------|------------|-----------|-----------|-------|------------|
| 0018.6852.7b76 | 80.62.0.5  | C6/1/0/U0 | w-online  | 2x1   | Wi6/1/0:1  |

The following is a sample output of the **show cable modem wideband channel** command for a specific cable interface:

```
Router# show cable modem Cable 6/1/0 wideband channel
```

| MAC Address    | IP Address | I/F       | MAC State | DSxUS | Primary WB |
|----------------|------------|-----------|-----------|-------|------------|
| 0018.6852.7b76 | 80.62.0.5  | C6/1/0/U0 | w-online  | 2x1   | Wi6/1/0:1  |
| 0019.474a.c182 | 80.62.0.2  | C6/1/0/U0 | w-online  | 2x1   | Wi6/1/0:1  |

[Table 133](#) describes the significant fields shown in the display:

**Table 133** *show cable modem wideband Field Descriptions*

| Field            | Description                                                                                                     |
|------------------|-----------------------------------------------------------------------------------------------------------------|
| MAC Address      | MAC address for the CM.                                                                                         |
| IP Address       | IP address that the DHCP server has assigned to the CM.                                                         |
| I/F              | Cable interface providing the upstream for this CM.                                                             |
| MAC State        | Current state of the MAC layer (see <a href="#">Table 134</a> ).                                                |
| Prim SID         | Primary SID assigned to this CM.                                                                                |
| Bonding group ID | Identifier of the primary wideband channel.                                                                     |
| DSID             | Downstream Service Identifier.                                                                                  |
| DSxUS            | Number of DS and US channels used by the CM.                                                                    |
| Primary WB       | Primary wideband channel for the CM.                                                                            |
| MD-DS-SG         | MAC Domain Downstream Service Group, the downstream channels of a single MAC domain that reach the cable modem. |

Following is a sample output of the **show cable modem wideband** command in Cisco IOS Release 12.2(33)SCG:

Router# **show cable modem cable 7/0/0 wideband channel**

| MAC Address    | IP Address | I/F       | MAC State    | DSxUS | Primary WB |
|----------------|------------|-----------|--------------|-------|------------|
| 001a.c30c.7f04 | 40.4.58.4  | C7/0/0/U3 | w-online(pt) | 3x1   | Wi7/0/0:0  |
| 54d4.6ffb.2f6b | 40.4.58.16 | C7/0/0/p  | w-online(pt) | 3x3   | Wi7/0/0:0  |
| 54d4.6ffb.30fd | 40.4.58.14 | C7/0/0/p  | w-online(pt) | 3x3   | Wi7/0/0:0  |
| 4458.2945.2ade | 40.4.58.18 | C7/0/0/p  | w-online(pt) | 3x3   | Wi7/0/0:0  |
| 001e.6bfc.d1ea | 40.4.58.26 | C7/0/0/p  | w-online     | 3x3   | Wi7/0/0:0  |
| 001a.c30c.7dbc | 40.4.58.7  | C7/0/0/U2 | w-online(pt) | 3x1   | Wi7/0/0:0  |
| 001a.c30c.7efc | 40.4.58.6  | C7/0/0/U2 | w-online(pt) | 3x1   | Wi7/0/0:0  |
| 001a.c30c.7e1e | 40.4.58.8  | C7/0/0/U2 | w-online(pt) | 3x1   | Wi7/0/0:0  |
| 54d4.6ffb.2e1b | 40.4.58.23 | C7/0/0/p  | w-online(pt) | 3x3   | Wi7/0/0:0  |
| 4458.2945.2a78 | 40.4.58.21 | C7/0/0/p  | w-online(pt) | 3x3   | Wi7/0/0:0  |
| 4458.2945.4604 | 40.4.58.19 | C7/0/0/p  | w-online(pt) | 3x3   | Wi7/0/0:0  |

Table 134 shows the possible values for the MAC State field for a wideband CM modem that registers as a traditional DOCSIS modem:

**Table 134** Descriptions for the MAC State Field (for Traditional DOCSIS Modems) <sup>1</sup>

| MAC State Value                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Registration and Provisioning Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| init(r1)                                               | The CM sent initial ranging.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| init(r2)                                               | The CM is ranging. The CMTS received initial ranging from the CM and has sent RF power, timing offset, and frequency adjustments to the CM.                                                                                                                                                                                                                                                                                                                                                                     |
| init(rc)                                               | Ranging has completed.<br><br><b>Note</b> If a CM appears to be stuck in this state, it could be that the CM is able to communicate successfully on the cable network, but that the upstream is at capacity and does not have any additional bandwidth to allow the CM to finish registration and come online. Either manually move one or more CMs to other upstreams, or enable load balancing on the upstream using the <b>cable load-balance group</b> commands.                                            |
| init(d)                                                | The DHCP request was received, as DHCPDISCOVER. This also indicates that the first IP broadcast packet has been received from the CM.                                                                                                                                                                                                                                                                                                                                                                           |
| init(dr)                                               | The DHCP request has been sent to the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init(i)                                                | The cable modem has received the DHCPOFFER reply (DHCPACK) from the DHCP server that has assigned an IP address to the modem, but the modem has not yet replied with a DHCPREQUEST message requesting that particular IP address, nor has it sent an IP packet with that IP address.<br><br><b>Note</b> If a CM appears to be stuck in this state, the CM has likely received the DHCPOFFER reply from the DHCP server, but this reply might have contained one or more invalid options for that particular CM. |
| init(io)                                               | The Cisco CMTS has seen the DHCP offer as sent to the cable modem from the DHCP server that has assigned an IP address to the modem.                                                                                                                                                                                                                                                                                                                                                                            |
| init(o)                                                | The CM has begun to download the option file (DOCSIS configuration file) using the Trivial File Transfer Protocol (TFTP), as specified in the DHCP response. If the CM remains in this state, it indicates that the download has failed.                                                                                                                                                                                                                                                                        |
| init(t)                                                | Time-of-day (TOD) exchange has started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Table 134** Descriptions for the MAC State Field (for Traditional DOCSIS Modems) <sup>1</sup>

| MAC State Value                                                                                                                                                                                                                                                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| resetting                                                                                                                                                                                                                                                                                              | The CM is being reset and will shortly restart the registration process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Non-error Status Conditions</b>                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| cc(r1)                                                                                                                                                                                                                                                                                                 | The CM had registered and was online, but has received a Downstream Channel Change (DCC) or Upstream Channel Change (UCC) request message from the CMTS. The CM has begun moving to the new channel, and the CMTS has received the CM's initial ranging on the new downstream or upstream channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                        |
| cc(r2)                                                                                                                                                                                                                                                                                                 | This state should normally follow cc(r1) and indicates that the CM has finished its initial ranging on the new channel, and is currently performing continuous ranging on the new channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                                                                                                                                |
| offline                                                                                                                                                                                                                                                                                                | The CM is considered offline (disconnected or powered down).                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| online                                                                                                                                                                                                                                                                                                 | The CM has registered and is enabled to pass data on the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| online(d)                                                                                                                                                                                                                                                                                              | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. The CM does not forward traffic to or from the CPE devices, but the CMTS can continue to communicate with the CM using DOCSIS messages and IP traffic (such as SNMP commands).</p> <p><b>Note</b> If BPI was enabled in the DOCSIS configuration file sent to the CM, assume that the CM is using BPI encryption, unless other messages show that the BPI negotiation and key assignments have failed.</p> |
| online(pkd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and KEK is assigned.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pk) states.</p>                                                                                                                                                                                                                                                                   |
| online(ptd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pt) states.</p>                                                                                                                                                                                                                            |
| online(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| online(pt)                                                                                                                                                                                                                                                                                             | <p>The CM registered, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> If network access was disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) instead of online(pt) even when BPI encryption is enabled and operational.</p>                                                                                                                                                                  |
| <p><b>Note</b> If an exclamation point (!) appears in front of one of the online states, it indicates that the <b>cable dynamic-secret</b> command has been used with either the <b>mark</b> or <b>reject</b> option, and that the cable modem has failed the dynamic secret authentication check.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| expire(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 134** Descriptions for the MAC State Field (for Traditional DOCSIS Modems) <sup>1</sup>

| MAC State Value                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| expire(pk)                     | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pk) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| expire(pt)                     | <p>The CM registered, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| expire(pte)                    | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Error Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| reject(m)                      | <p>The CM attempted to register but registration was refused due to a bad Message Integrity Check (MIC) value. This also could indicate that the shared secret in the DOCSIS configuration file does not match the value configured on the CMTS with the <b>cable shared-secret</b> command.</p> <p>In Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases, this could also indicate that the <b>cable tftp-enforce</b> command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so.</p>                                                                                                                                                                                                                   |
| reject(c)                      | <p>The CM attempted to register, but registration was refused due to a number of possible errors:</p> <ul style="list-style-type: none"> <li>• The CM attempted to register with a minimum guaranteed upstream bandwidth that would exceed the limits imposed by the <b>cable upstream admission-control</b> command.</li> <li>• The CM has been disabled because of a security violation.</li> <li>• A bad class of service (COS) value in the DOCSIS configuration file.</li> <li>• The CM attempted to create a new COS configuration but the CMTS is configured to not permit such changes.</li> <li>• The CM failed the timestamp check for its DOCSIS configuration file. (This could indicate a possible theft-of-service attempt, or a problem with the synchronization of the clocks on the CM and CMTS.)</li> </ul> |
| reject(pk)                     | <p>KEK key assignment is rejected, BPI encryption has not been established.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| reject(pke)                    | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pk) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| reject(pt)                     | <p>TEK key assignment is rejected, BPI encryption has not been established.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| reject(pte)                    | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

**Table 134** Descriptions for the MAC State Field (for Traditional DOCSIS Modems) <sup>1</sup>

| MAC State Value | Description                                                                                                                                                                                                                                                                                                              |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| reject(ts)      | The CM attempted to register, but registration failed because the TFTP server timestamp in the CM registration request did not match the timestamp maintained by the CMTS. This might indicate that the CM attempted to register by replaying an old DOCSIS configuration file used during a prior registration attempt. |
| reject(ip)      | The CM attempted to register, but registration failed because the IP address in the CM request did not match the IP address that the TFTP server recorded when it sent the DOCSIS configuration file to the CM. IP spoofing could be occurring.                                                                          |
| reject(na)      | The CM attempted to register, but registration failed because the CM did not send a Registration-Acknowledgement (REG-ACK) message in reply to the Registration-Response (REG-RSP) message sent by the CMTS. A Registration-NonAcknowledgement (REG-NACK) is assumed.                                                    |

1. The CM MAC state field can also be retrieved using SNMP by getting the value of the cdxCmtsCmStatusValue object in the CISCO-DOCS-EXT-MIB.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

Table 135 shows the possible values for the MAC state field for a wideband-capable CM that registers as a wideband modem:

**Table 135** Additional MAC States for a Wideband Cable Modem

| MAC State Value                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Non-error Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| w-online                           | The WCM has registered and is enabled to pass data on the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| w-online(d)                        | <p>The WCM registered, but network access for CPE devices using this WCM has been disabled through the DOCSIS configuration file. The CM does not forward traffic to or from the CPE devices, but the WCMTS can continue to communicate with the WCM using DOCSIS messages and IP traffic (such as SNMP commands).</p> <p><b>Note</b> If BPI was enabled in the DOCSIS configuration file sent to the WCM, assume that the CM is using BPI encryption, unless other messages show that the BPI negotiation and key assignments have failed.</p> |
| w-online(pkd)                      | <p>The WCM registered, but network access for CPE devices using this WCM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and KEK is assigned.</p> <p><b>Note</b> This state is equivalent to the w-online(d) and w-online(pk) states.</p>                                                                                                                                                                                                                                                                  |
| w-online(pt)                       | <p>The WCM registered, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> If network access was disabled in the DOCSIS configuration file sent to the WCM, the network disabled status takes precedence, and the MAC status field shows w-online(d) instead of w-online(pt) even when BPI encryption is enabled and operational.</p>                                                                                                                                                                 |

**Table 135 Additional MAC States for a Wideband Cable Modem**

| MAC State Value                | Description                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| w-online(ptd)                  | The WCM registered, but network access for CPE devices using this WCM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and TEK is assigned. BPI encryption is now being performed.<br><b>Note</b> This state is equivalent to the w-online(d) and w-online(pt) states.                                             |
| w-online(pk)                   | The WCM registered, BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                |
| w-expire(pk)                   | The WCM registered, BPI is enabled, KEK was assigned, but the current KEK expired before the WCM could successfully renew a new KEK value.                                                                                                                                                                                                             |
| w-expire(pkd)                  | The WCM registered, but network access for CPE devices using this WCM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.<br><b>Note</b> This state is equivalent to the w-online(d) and w-expire(pk) states.  |
| w-expire(pt)                   | The WCM registered, BPI is enabled, TEK was assigned, but the current TEK expired before the WCM could successfully renew a new KEK value.                                                                                                                                                                                                             |
| w-expire(ptd)                  | The WCM registered, but network access for CPE devices using this WCM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, TEK was assigned, but the current TEK expired before the WCM could successfully renew a new KEK value.<br><b>Note</b> This state is equivalent to the w-online(d) and w-expire(pt) states. |
| <b>Error Status Conditions</b> |                                                                                                                                                                                                                                                                                                                                                        |
| w-reject(pk)                   | KEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                               |
| w-reject(pkd)                  | The WCM registered, but network access for CPE devices using this WCM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected.<br><b>Note</b> This state is equivalent to the w-online(d) and w-reject(pk) states.                                            |
| w-reject(pt)                   | TEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                               |
| w-reject(ptd)                  | The WCM registered, but network access for CPE devices using this WCM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected.<br><b>Note</b> This state is equivalent to the w-online(d) and w-reject(pt) states.                                            |

**Related Commands**

| Command                             | Description                                                                                              |
|-------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>show cable modem vendor</b>      | Associates the name of a vendor with its Organizational Unique Identifier (OUI).                         |
| <b>show cable modem</b>             | Displays information for the registered and unregistered CMs.                                            |
| <b>show cable modem summary</b>     | Displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem classifiers</b> | Displays information about the classifiers for a particular CM.                                          |
| <b>show cable modem cnr</b>         | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.       |



| Command                              | Description                                                                      |
|--------------------------------------|----------------------------------------------------------------------------------|
| <b>show cable modem connectivity</b> | Displays connectivity statistics for one or more CMs.                            |
| <b>show cable modem errors</b>       | Displays error statistics for one or more CMs.                                   |
| <b>show cable modem flap</b>         | Displays flap list statistics for one or more cable modems.                      |
| <b>show cable modem maintenance</b>  | Displays station maintenance (SM) error statistics for one or more cable modems. |
| <b>show cable modem remote-query</b> | Displays information collected by the remote-query feature.                      |
| <b>show cable modem rf-adapt</b>     | Displays RF adaptation information for cable modems.                             |
| <b>show cable modulation-profile</b> | Displays modulation profile group information.                                   |
| <b>show interface cable modem</b>    | Displays information about the CMs connected to a particular cable interface.    |
| <b>show interface cable sid</b>      | Displays cable interface information.                                            |

# show cable modem wideband phy

To display the physical information of registered and unregistered wideband CMs on the Cisco CMTS router, use the **show cable modem wideband phy** command in privileged EXEC mode.

**show cable modem wideband phy**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

**Examples** The following is a sample output for the default form of the **show cable modem wideband phy** command:

```
Router# show cable modem wideband phy
```

| MAC Address    | IP Address | I/F       | MAC State    | Chan Desc | Frq (MHZ) | SNR (db) | Pwr (dBmV) |
|----------------|------------|-----------|--------------|-----------|-----------|----------|------------|
| 001a.c30c.7f04 | 40.4.58.4  | C7/0/0/U3 | w-online(pt) | dsPri     | 555       | -----    | 0.00       |
|                |            |           |              | dsSec     | 561       | N/A      | N/A        |
|                |            |           |              | dsSec     | 567       | N/A      | N/A        |
|                |            |           |              | us3       | 13        | 36.12    | 0.00       |
| 54d4.6ffb.2f6b | 40.4.58.16 | C7/0/0/p  | w-online(pt) | dsPri     | 555       | -----    | 0.00       |
|                |            |           |              | dsSec     | 561       | N/A      | N/A        |
|                |            |           |              | dsSec     | 567       | N/A      | N/A        |
|                |            |           |              | us0       | 31        | 36.12    | 45.00      |
|                |            |           |              | us1       | 37        | -----    | 44.00      |
|                |            |           |              | us2       | 20        | 36.12    | 44.50      |
|                |            |           |              | us3       | 13        | 36.12    | 44.00      |
| 54d4.6ffb.30fd | 40.4.58.14 | C7/0/0/p  | w-online(pt) | dsPri     | 561       | -----    | 0.00       |
|                |            |           |              | dsSec     | 555       | N/A      | N/A        |
|                |            |           |              | dsSec     | 567       | N/A      | N/A        |
|                |            |           |              | us0       | 31        | 36.12    | 44.75      |
|                |            |           |              | us1       | 37        | -----    | 44.00      |
|                |            |           |              | us2       | 20        | 36.12    | 44.00      |
|                |            |           |              | us3       | 13        | 36.12    | 44.75      |
| 4458.2945.2ade | 40.4.58.18 | C7/0/0/p  | w-online(pt) | dsPri     | 555       | -----    | 0.00       |
|                |            |           |              | dsSec     | 561       | N/A      | N/A        |
|                |            |           |              | dsSec     | 567       | N/A      | N/A        |
|                |            |           |              | us0       | 31        | 36.12    | 23.50      |
|                |            |           |              | us1       | 37        | -----    | 23.50      |
|                |            |           |              | us2       | 20        | 36.12    | 23.50      |
|                |            |           |              | us3       | 13        | 36.12    | 23.50      |
| 001e.6bfc.d1ea | 40.4.58.26 | C7/0/0/p  | w-online     | dsPri     | 555       | -----    | 0.00       |
|                |            |           |              | dsSec     | 561       | N/A      | N/A        |
|                |            |           |              | dsSec     | 567       | N/A      | N/A        |
|                |            |           |              | us0       | 31        | 36.12    | 46.25      |
|                |            |           |              | us1       | 37        | -----    | 46.25      |
|                |            |           |              | us2       | 20        | 36.12    | 46.25      |
|                |            |           |              | us3       | 13        | 36.12    | 46.25      |

|                           |           |              |       |     |       |       |
|---------------------------|-----------|--------------|-------|-----|-------|-------|
| 54d4.6ffb.2e21 40.4.58.5  | C7/0/0/p  | w-online(pt) | dsPri | 555 | ----- | 0.00  |
|                           |           |              | dsSec | 561 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us0   | 31  | 36.12 | 45.50 |
|                           |           |              | us1   | 37  | ----- | 45.00 |
|                           |           |              | us2   | 20  | 36.12 | 45.00 |
| 001a.c30c.7dbc 40.4.58.7  | C7/0/0/U2 | w-online(pt) | dsPri | 555 | ----- | 0.00  |
|                           |           |              | dsSec | 561 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us2   | 20  | 36.12 | 0.00  |
|                           |           |              | us3   | 13  | 36.12 | 45.00 |
|                           |           |              | us0   | 31  | 36.12 | 45.50 |
| 001a.c30c.7efc 40.4.58.6  | C7/0/0/U2 | w-online(pt) | dsPri | 555 | ----- | 0.00  |
|                           |           |              | dsSec | 561 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us2   | 20  | 36.12 | 0.00  |
|                           |           |              | us3   | 13  | 36.12 | 45.00 |
|                           |           |              | us0   | 31  | 36.12 | 45.50 |
| 001a.c30c.7ele 40.4.58.8  | C7/0/0/U2 | w-online(pt) | dsPri | 555 | ----- | 0.00  |
|                           |           |              | dsSec | 561 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us2   | 20  | 36.12 | 0.00  |
|                           |           |              | us3   | 13  | 36.12 | 45.00 |
|                           |           |              | us0   | 31  | 36.12 | 45.50 |
| 54d4.6ffb.2e1b 40.4.58.23 | C7/0/0/p  | w-online(pt) | dsPri | 561 | ----- | 0.00  |
|                           |           |              | dsSec | 555 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us0   | 31  | 36.12 | 45.00 |
|                           |           |              | us1   | 37  | ----- | 44.25 |
|                           |           |              | us2   | 20  | 36.12 | 44.25 |
| 4458.2945.2a78 40.4.58.21 | C7/0/0/p  | w-online(pt) | dsPri | 561 | ----- | 0.00  |
|                           |           |              | dsSec | 555 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us0   | 31  | 36.12 | 34.75 |
|                           |           |              | us1   | 37  | ----- | 33.00 |
|                           |           |              | us2   | 20  | 36.12 | 33.00 |
| 4458.2945.4604 40.4.58.19 | C7/0/0/p  | w-online(pt) | dsPri | 555 | ----- | 0.00  |
|                           |           |              | dsSec | 561 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us0   | 31  | 36.12 | 23.75 |
|                           |           |              | us1   | 37  | ----- | 23.75 |
|                           |           |              | us2   | 20  | 36.12 | 24.00 |
| 001e.6bfb.0662 40.4.58.11 | C8/0/0/UB | w-online(pt) | dsPri | 555 | ----- | 0.00  |
|                           |           |              | dsSec | 561 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us0   | 15  | 36.12 | 27.50 |
|                           |           |              | us1   | 25  | 36.12 | 27.00 |
|                           |           |              | us2   | 35  | 27.70 | 29.00 |
| 001e.6bfb.01aa ---        | C8/0/0/UB | w-online(pt) | dsPri | 573 | ----- | 0.00  |
|                           |           |              | dsSec | 555 | N/A   | N/A   |
|                           |           |              | dsSec | 561 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us0   | 15  | 36.12 | 26.75 |
|                           |           |              | us1   | 25  | 36.12 | 26.75 |
| 54d4.6ffb.2e66 ---        | C8/0/0/p  | w-online(pt) | dsPri | 555 | ----- | 0.00  |
|                           |           |              | dsSec | 561 | N/A   | N/A   |
|                           |           |              | dsSec | 567 | N/A   | N/A   |
|                           |           |              | us0   | 15  | 36.12 | 26.25 |
|                           |           |              | us1   | 25  | 36.12 | 28.75 |
|                           |           |              | us2   | 35  | 28.26 | 27.00 |
|                           |           |              | us3   | 45  | 28.26 | 38.00 |

Table 133 describes the significant fields shown in the display:

**Table 136** *show cable modem wideband phy* Field Descriptions

| Field           | Description                                               |
|-----------------|-----------------------------------------------------------|
| MAC Address     | MAC address of the CM.                                    |
| IP Address      | IP address that the DHCP server has assigned to the CM.   |
| I/F             | Cable interface providing the upstream to the CM.         |
| MAC State       | Current state of the MAC layer.                           |
| Chan Desc       | Descriptive name of the channel.                          |
| Frq State (MHZ) | Frequency value.                                          |
| SNR (db)        | Upstream signal-to-noise ratio (SNR) for a particular CM. |
| Pwr (dBmV)      | Power value.                                              |

#### Related Commands

| Command                           | Description                                                                                              |
|-----------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>show cable modem</b>           | Displays information for the registered and unregistered CMs.                                            |
| <b>show cable modem summary</b>   | Displays voice call information for a particular CM, identified either by its IP address or MAC address. |
| <b>show cable modem wideband</b>  | Displays information of registered and unregistered wideband CMs.                                        |
| <b>show interface cable modem</b> | Displays information about the CMs connected to a particular cable interface.                            |

# show cable modem wideband primary-channel

To display primary-channel information for a wideband channel, use the **show cable modem wideband primary-channel** command in privileged EXEC mode.

**show cable modem** [*ip-address* | *mac-address*] **wideband primary-channel**

|                           |                    |                                                                                                                                                                                                           |
|---------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>ip-address</i>  | Identifies the IP address of a specific cable modem to be displayed. If you specify the IP address for a CPE device behind a cable modem, information for that cable modem is displayed.                  |
|                           | <i>mac-address</i> | Identifies the MAC address of a specific cable modem to be displayed. You can also specify the MAC address for a CPE device behind a cable modem, and information for that cable modem will be displayed. |

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

|                        |                |                                                            |
|------------------------|----------------|------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                        |
|                        | 12.3(23)BC     | This command was introduced for the Cisco uBR10012 router. |

|                         |                                                                                                                                                                                              |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command displays primary-channel information for a wideband channel that is associated with a specific MAC address or IP address of a cable modem or CPE device behind the cable modem. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                                                       |                                                                                                                   |
|-------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>                                        | <b>Description</b>                                                                                                |
|                         | <b>show cable modem</b>                               | Displays information for the registered and unregistered cable modems.                                            |
|                         | <b>show cable modem primary-channel summary total</b> | Displays information for the wideband and narrowband cable modems and location of the primary downstream channel. |

# show cable modem wideband rcs-status

To display details of events for each RF channel in the cable modem's receive channel configuration (RCC), use the **show cable modem wideband rcs-status** command in privileged EXEC mode.

```
show cable modem [mac-address | ip-address | cable slot/subslot/port] wideband rcs-status
```

|                    |                         |                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | mac-address             | (Optional) Specifies the MAC address of a wideband CM to be displayed.                                                                                                                                                                                                                                                                                                 |
|                    | ip-address              | (Optional) Specifies the IP address of a wideband CM to be displayed.                                                                                                                                                                                                                                                                                                  |
|                    | cable slot/subslot/port | Optional) Identifies a cable interface on the Cisco uBR10012 router. The following are the valid values:                                                                                                                                                                                                                                                               |
|                    |                         | <ul style="list-style-type: none"><li>slot—Specifies the chassis slot number of the cable interface line card. Valid values are 5 to 8.</li><li>subslot—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li><li>port—Specifies the port number. Valid values are 0 to 4 (depending on the cable interface).</li></ul> |

|                 |                                |
|-----------------|--------------------------------|
| Command Default | No default behavior or values. |
|-----------------|--------------------------------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCB | This command was introduced. |

## Examples

The following is a sample output of the **show cable modem wideband rcs-status** command on a wideband cable interface:

```
Router# show cable modem wideband rcs-status
```

```
CM : 0019.474a.c0ba
RF : 1/0/0 10
 Status : UP
 FEC/QAM Failure : 0
 Dup FEC/QAM Failure : 0
 FEC/QAM Recovery : 0
 Dup FEC/QAM Recovery : 0
 MDD Failure : 0
 Dup MDD Failure : 0
 MDD Recovery : 0
 Dup MDD Recovery : 0
 Flaps : 0
 Flap Duration : 00:00
RF : 1/0/0 11
 Status : UP
 FEC/QAM Failure : 0
 Dup FEC/QAM Failure : 0
 FEC/QAM Recovery : 0
 Dup FEC/QAM Recovery : 0
 MDD Failure : 0
 Dup MDD Failure : 0
 MDD Recovery : 0
 Dup MDD Recovery : 0
 Flaps : 0
 Flap Duration : 00:00
```

## Related Commands

| Command                               | Description                                                    |
|---------------------------------------|----------------------------------------------------------------|
| <b>show cable modem summary wb-rf</b> | Displays the number of RFs that are down on a cable interface. |

# show cable modulation-profile

To display modulation profile group information for a Cisco CMTS, use the **show cable modulation-profile** command in privileged EXEC mode.

```
show cable modulation-profile [profile [verbose]] [iuc-code]

show cable modulation-profile cable {slot/port | slot/subslot/port} [upstream port]
```

## Syntax Description

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>profile</i>                        | (Optional) Profile number. Valid values start with 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>verbose</b>                        | (Optional) Displays detailed information for an individual profile.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>iuc-code</i>                       | (Optional) Internal usage code (IUC). Valid options are: <div> <b>a-long</b>—Advanced Phy Long Grant Burst (IUC 10)<br/> <b>a-short</b>—Advanced Phy Short Grant Burst (IUC 9)<br/> <b>a-ugs</b>—Advanced Phy Unsolicited Grant Burst (IUC 11)<br/> <b>initial</b>—Initial Ranging Burst (IUC 3)<br/> <b>long</b>—Long Grant Burst (IUC 6)<br/> <b>reqdata</b>—Request/Data Burst (IUC 2) <sup>1</sup><br/> <b>request</b>—Request Burst (IUC 1)<br/> <b>short</b>—Short Grant Burst (IUC 5)<br/> <b>station</b>—Station Ranging Burst (IUC 4)           </div> |
| <b>cable</b> <i>slot/port</i>         | Identifies a cable interface and downstream port on the Cisco uBR7100 series and Cisco uBR7200 series routers.<br><br>On the Cisco uBR7100 series router, the only valid value is <b>1/0</b> . On the Cisco uBR7200 series router, <i>slot</i> can range from 3 to 6, and <i>port</i> can be 0 or 1, depending on the cable interface.                                                                                                                                                                                                                          |
| <b>cable</b> <i>slot/subslot/port</i> | Identifies a cable interface on the Cisco uBR10012 router. The following are the valid values: <div> <ul style="list-style-type: none"> <li><i>slot</i> = 5 to 8</li> <li><i>subslot</i> = 0 or 1</li> <li><i>port</i> = 0 to 4 (depending on the cable interface)</li> </ul> </div>                                                                                                                                                                                                                                                                            |
| <b>upstream</b> <i>port</i>           | (Optional) Displays information for a particular upstream on the selected cable interface. The <i>port</i> value starts with 0 and continues up, depending on the type of cable interface card.                                                                                                                                                                                                                                                                                                                                                                 |

1. The Cisco CMTS recognizes the **reqdata** burst type but does not use it.

## Command Modes

Privileged EXEC

## Command History

| Release                         | Modification                                                                       |
|---------------------------------|------------------------------------------------------------------------------------|
| 11.3 XA                         | This command was first introduced.                                                 |
| 12.(0)5T1, 12.0(6)SC, 12.1(2)EC | This command was supported, replacing the <b>show cable burst-profile</b> command. |



| Release     | Modification                                                                                                                                                                                                                                                                                                          |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC  | This <b>reqdata</b> type was added as a placeholder for scripts that might reference it, but the DOCSIS MAC scheduler on the Cisco CMTS does not use this type of burst.                                                                                                                                              |
| 12.2(15)CX  | Support was added for the Cisco uBR-MC28U/X cable interface line card, including support for DOCSIS 2.0 A-TDMA and mixed modulation profiles. This includes adding additional information to the command's display, as well as adding the <b>a-long</b> , <b>a-short</b> , <b>a-ugs</b> , and <b>verbose</b> options. |
| 12.2(15)CX1 | Added the ability to display the modulation profiles being used by a particular cable interface and upstream.                                                                                                                                                                                                         |
| 12.2(15)BC2 | This command displays all default modulation profiles 1, 21, 41, 101, 121, 201, 221, and 241), even when the cable interface card that is associated with those profiles is not installed. Previous releases displayed only the default modulation profiles that were in use.                                         |

### Usage Guidelines

The **show cable modulation-profile** command displays modulation profile group information. A modulation profile is a collection of burst profiles that are sent out in a Upstream Channel Descriptor (UCD) message to configure a modem's transmit parameters for an upstream message burst type.

Table 0-137 shows the IUC codes for each burst type:

**Table 0-137 Internal Usage Code Types**

| IUC   | Type                                               | IUC    | Type                                                  |
|-------|----------------------------------------------------|--------|-------------------------------------------------------|
| IUC 1 | Request Burst ( <b>req</b> )                       | IUC 7  | Not used                                              |
| IUC 2 | Request/Data Burst ( <b>reqdata</b> ) <sup>1</sup> | IUC 8  | Not used                                              |
| IUC 3 | Initial Ranging Burst ( <b>initial</b> )           | IUC 9  | Advanced Phy Short Grant Burst ( <b>a-short</b> )     |
| IUC 4 | Station Ranging Burst ( <b>station</b> )           | IUC 10 | Advanced Phy Long Grant Burst ( <b>a-long</b> )       |
| IUC 5 | Short Grant Burst ( <b>short</b> )                 | IUC 11 | Advanced Phy Unsolicited Grant Burst ( <b>a-ugs</b> ) |
| IUC 6 | Long Grant Burst ( <b>long</b> )                   | IUC 12 | Not used                                              |

1. The Cisco CMTS recognizes the **reqdata** burst type but does not use it.

### Modulation Profile Ranges

The ranges for modulation profiles depends on the cable interface being used and the type of modulation profile being created. Table 0-138 lists the valid ranges according to cable interface and modulation type:

**Table 0-138 Allowable Ranges for Modulation Profiles**

| Cable Interface      | DOCSIS 1.X (TDMA)                | Mixed DOCSIS 1.X/2.0 | DOCSIS 2.0 (A-TDMA) |
|----------------------|----------------------------------|----------------------|---------------------|
| Cisco uBR7100 series | 1 to 10 <sup>1</sup> , default=1 | N/A                  | N/A                 |
| Cisco uBR-MC16C      | 1 to 10, default=1               | N/A                  | N/A                 |
| Cisco uBR-MC16S      | 1 to 10, default=1               | N/A                  | N/A                 |
| Cisco uBR-MC28C      | 1 to 10, default=1               | N/A                  | N/A                 |

**Table 0-138 Allowable Ranges for Modulation Profiles**

| Cable Interface                                                     | DOCSIS 1.X (TDMA)    | Mixed DOCSIS 1.X/2.0    | DOCSIS 2.0 (A-TDMA)     |
|---------------------------------------------------------------------|----------------------|-------------------------|-------------------------|
| Cisco uBR10-MC5X20S,<br>Cisco uBR10-MC5X20U,<br>Cisco uBR10-MC5X20H | 21 to 30, default=21 | 121 to 130, default=121 | 221 to 230, default=221 |
| Cisco uBR-MC16U/X,<br>Cisco uBR-MC28U/X                             | 41 to 50, default=41 | 141 to 150, default=141 | 241 to 250, default=241 |

- Only 8 modulation profiles are supported in Cisco IOS software releases before 12.2(15)BC1, so in these releases the valid range is 1 to 8.

**Note**

Default modulation profiles are created for each type of card and operation mode. You cannot delete the default modulation profiles (1, 21, 41, 101, 121, 201, 221, and 241). In Cisco IOS Release 12.2(15)BC2 and later, all default modulation profiles are displayed, even when that particular cable interface is not installed. In previous versions, only the default modulation profiles that were in use were displayed.

**Examples**

The following is sample output from the **show cable modulation-profile** command in Cisco IOS Release 12.2(11)BC3 and earlier releases:

CMTS01# **show cable modulation-profile**

| Mo | IUC     | Type | Preamb<br>length | Diff<br>enco | FEC<br>T<br>bytes | FEC<br>CW<br>size | Scrambl<br>seed | Max<br>B<br>size | Guard<br>time<br>size | Last<br>CW<br>short | Scrambl | Preamb<br>offset |
|----|---------|------|------------------|--------------|-------------------|-------------------|-----------------|------------------|-----------------------|---------------------|---------|------------------|
| 1  | request | qpsk | 64               | no           | 0x0               | 0x10              | 0x152           | 1                | 8                     | no                  | yes     | 56               |
| 1  | initial | qpsk | 128              | no           | 0x5               | 0x22              | 0x152           | 0                | 48                    | no                  | yes     | 0                |
| 1  | station | qpsk | 128              | no           | 0x5               | 0x22              | 0x152           | 0                | 48                    | no                  | yes     | 0                |
| 1  | short   | qpsk | 72               | no           | 0x5               | 0x4B              | 0x152           | 0                | 8                     | no                  | yes     | 48               |

The following is sample output from the **show cable modulation-profile** command in Cisco IOS Release 12.2(15)CX and later releases:

Router# **show cable modulation-profile**

| Mod | IUC     | Type  | Pre<br>len | Diff<br>enco | FEC<br>T<br>BYTE | FEC<br>k<br>BYTE | Scrm<br>seed | Max<br>B<br>siz | Guard<br>time<br>size | Last<br>CW<br>short | Scrm<br>Pre<br>offst | Pre<br>Type | RS       |
|-----|---------|-------|------------|--------------|------------------|------------------|--------------|-----------------|-----------------------|---------------------|----------------------|-------------|----------|
| 1   | request | qpsk  | 64         | no           | 0x0              | 0x10             | 0x152        | 0               | 8                     | no                  | yes                  | 184         | qpsk na  |
| 1   | initial | qpsk  | 128        | no           | 0x5              | 0x22             | 0x152        | 0               | 48                    | no                  | yes                  | 128         | qpsk na  |
| 1   | station | qpsk  | 128        | no           | 0x5              | 0x22             | 0x152        | 0               | 48                    | no                  | yes                  | 128         | qpsk na  |
| 1   | short   | qpsk  | 72         | no           | 0x4              | 0x4C             | 0x152        | 12              | 8                     | yes                 | yes                  | 176         | qpsk na  |
| 1   | long    | qpsk  | 80         | no           | 0x9              | 0xEC             | 0x152        | 0               | 8                     | yes                 | yes                  | 168         | qpsk na  |
| 41  | request | qpsk  | 68         | no           | 0x0              | 0x10             | 0x152        | 0               | 8                     | no                  | yes                  | 0           | qpsk na  |
| 41  | initial | qpsk  | 128        | no           | 0x5              | 0x22             | 0x152        | 0               | 48                    | no                  | yes                  | 0           | qpsk na  |
| 41  | station | qpsk  | 128        | no           | 0x5              | 0x22             | 0x152        | 0               | 48                    | no                  | yes                  | 0           | qpsk na  |
| 41  | short   | qpsk  | 80         | no           | 0x4              | 0x4C             | 0x152        | 12              | 8                     | yes                 | yes                  | 0           | qpsk na  |
| 41  | long    | qpsk  | 80         | no           | 0x8              | 0xEC             | 0x152        | 0               | 8                     | yes                 | yes                  | 0           | qpsk na  |
| 45  | request | qpsk  | 68         | no           | 0x0              | 0x10             | 0x152        | 0               | 8                     | no                  | yes                  | 0           | qpsk na  |
| 45  | initial | qpsk  | 128        | no           | 0x5              | 0x22             | 0x152        | 0               | 48                    | no                  | yes                  | 0           | qpsk na  |
| 45  | station | qpsk  | 128        | no           | 0x5              | 0x22             | 0x152        | 0               | 48                    | no                  | yes                  | 0           | qpsk na  |
| 45  | short   | 16qam | 160        | no           | 0x6              | 0x4C             | 0x152        | 7               | 8                     | yes                 | yes                  | 0           | 16qam na |
| 45  | long    | 16qam | 160        | no           | 0x8              | 0xE7             | 0x152        | 0               | 8                     | yes                 | yes                  | 0           | 16qam na |
| 141 | request | qpsk  | 68         | no           | 0x0              | 0x10             | 0x152        | 0               | 8                     | no                  | yes                  | 0           | qpsk na  |
| 141 | initial | qpsk  | 128        | no           | 0x5              | 0x22             | 0x152        | 0               | 48                    | no                  | yes                  | 0           | qpsk na  |
| 141 | station | qpsk  | 128        | no           | 0x5              | 0x22             | 0x152        | 0               | 48                    | no                  | yes                  | 0           | qpsk na  |

```

141 short 16qam 160 no 0x6 0x4C 0x152 7 8 yes yes 0 16qam na
141 long 16qam 160 no 0x8 0xE7 0x152 0 8 yes yes 0 16qam na
141 a-short 32qam 160 no 0x9 0x4C 0x152 6 8 yes yes 0 qpsk1 no
141 a-long 64qam 196 no 0xC 0xE7 0x152 0 8 yes yes 0 qpsk1 no
241 request qpsk 68 no 0x0 0x10 0x152 0 8 no yes 0 qpsk0 no
241 initial qpsk 128 no 0x5 0x22 0x152 0 48 no yes 0 qpsk0 no
241 station qpsk 128 no 0x5 0x22 0x152 0 48 no yes 0 qpsk0 no
241 a-short 32qam 160 no 0x9 0x4C 0x152 6 8 yes yes 0 qpsk1 no
241 a-long 64qam 196 no 0xC 0xE7 0x152 0 8 yes yes 0 qpsk1 no
241 a-ugs 16qam 80 no 0x3 0xE7 0x152 0 8 yes yes 0 qpsk1 no
242 request qpsk 68 no 0x0 0x10 0x152 0 8 no yes 0 qpsk0 no
242 initial qpsk 128 no 0x5 0x22 0x152 0 48 no yes 0 qpsk0 no
242 station qpsk 128 no 0x5 0x22 0x152 0 48 no yes 0 qpsk0 no
242 a-short qpsk 80 no 0x4 0x4C 0x152 12 8 yes yes 0 qpsk0 no
242 a-long qpsk 68 no 0x8 0xEC 0x152 0 8 yes yes 0 qpsk0 no
242 a-ugs qpsk 80 no 0x0 0xEC 0x152 0 8 yes yes 0 qpsk0 no
243 request 64qam 132 no 0x4 0x10 0x152 0 8 no yes 0 qpsk1 no
243 initial 64qam 128 no 0x5 0x22 0x152 0 48 no yes 0 qpsk1 no
243 station 64qam 128 no 0x5 0x22 0x152 0 48 no yes 0 qpsk1 no
243 a-short 64qam 160 no 0x9 0x4C 0x152 5 8 yes yes 0 qpsk1 no
243 a-long 64qam 196 no 0xC 0xE7 0x152 0 8 yes yes 0 qpsk1 no
243 a-ugs 64qam 100 no 0x7 0xE7 0x152 0 8 yes yes 0 qpsk1 no
244 request 64qam 132 no 0x4 0x10 0x152 0 8 no yes 0 qpsk1 no
244 initial 64qam 128 no 0x5 0x22 0x152 0 48 no yes 0 qpsk1 no
244 station 64qam 128 no 0x5 0x22 0x152 0 48 no yes 0 qpsk1 no
244 a-short 64qam 160 no 0x9 0x4C 0x152 5 8 yes yes 0 qpsk1 no
244 a-long 64qam 196 no 0xC 0xE7 0x152 0 8 yes yes 0 qpsk1 no
244 a-ugs 64qam 32 no 0xA 0xC8 0x152 255 32 yes yes 0 qpsk1 yes
245 initial qpsk 32 no 0xA 0xC8 0x152 32 32 no yes 0 qpsk1 yes
245 station qpsk 32 no 0xA 0xC8 0x152 32 32 yes yes 0 qpsk1 yes
245 a-short 64qam 64 no 0xA 0xC8 0x152 32 32 yes yes 0 qpsk1 yes
245 a-long 64qam 32 no 0xA 0xC8 0x152 252 32 yes yes 0 qpsk1 yes
245 a-ugs 64qam 32 no 0xA 0xC8 0x152 32 32 yes yes 0 qpsk1 yes

```

Router#

The following shows sample output from the **show cable modulation-profile** command for a mixed mode modulation profile (TDMA/A-TDMA) on the Cisco uBR10-MC5X20S cable interface line card:

Router# **show cable modulation-profile 121**

| Mod | IUC     | Type  | Pre len | Diff enco | FEC T | FEC k | Scramb seed | Max B | Guard time | Last CW | Scramb short | Pre offst | Pre Type | RS |
|-----|---------|-------|---------|-----------|-------|-------|-------------|-------|------------|---------|--------------|-----------|----------|----|
|     |         |       |         |           | BYTE  | BYTE  | siz         | size  |            |         |              |           |          |    |
| 121 | request | qpsk  | 32      | no        | 0x0   | 0x10  | 0x152       | 0     | 20         | no      | yes          | 0         | qpsk     | na |
| 121 | initial | qpsk  | 64      | no        | 0x5   | 0x22  | 0x152       | 0     | 48         | no      | yes          | 64        | qpsk     | na |
| 121 | station | qpsk  | 64      | no        | 0x5   | 0x22  | 0x152       | 0     | 48         | no      | yes          | 64        | qpsk     | na |
| 121 | short   | qpsk  | 64      | no        | 0x5   | 0x4B  | 0x152       | 6     | 20         | yes     | yes          | 64        | qpsk     | na |
| 121 | long    | qpsk  | 64      | no        | 0x8   | 0xDC  | 0x152       | 0     | 20         | yes     | yes          | 64        | qpsk     | na |
| 121 | a-short | 64qam | 128     | no        | 0x5   | 0x63  | 0x152       | 10    | 20         | yes     | yes          | 192       | qpsk0    | no |
| 121 | a-long  | 64qam | 128     | no        | 0xF   | 0xC8  | 0x152       | 0     | 20         | yes     | yes          | 192       | qpsk0    | no |

Router#

The following shows sample output from the **show cable modulation-profile** command for two DOCSIS 2.0 modulation profiles (A-TDMA) on the Cisco uBR10-MC5X20S cable interface line card:

Router# **show cable modulation-profile 221**

| Mod | IUC     | Type | Pre len | Diff enco | FEC T | FEC k | Scramb seed | Max B | Guard time | Last CW | Scramb short | Pre offst | Pre Type | RS |
|-----|---------|------|---------|-----------|-------|-------|-------------|-------|------------|---------|--------------|-----------|----------|----|
|     |         |      |         |           | BYTE  | BYTE  | siz         | size  |            |         |              |           |          |    |
| 221 | request | qpsk | 64      | no        | 0x0   | 0x10  | 0x152       | 0     | 8          | no      | yes          | 184       | qpsk0    | na |
| 221 | initial | qpsk | 128     | no        | 0x5   | 0x22  | 0x152       | 0     | 48         | no      | yes          | 0         | qpsk0    | na |

## show cable modulation-profile

```

221 station qpsk 128 no 0x5 0x22 0x152 0 48 no yes 0 qpsk0 na
221 short qpsk 72 no 0x5 0x4B 0x152 6 8 yes yes 176 qpsk0 na
221 long qpsk 80 no 0x8 0xDC 0x152 0 8 yes yes 168 qpsk0 na
221 a-short 64qam 128 no 0x5 0x63 0x152 10 20 yes yes 192 qpsk0 no
221 a-long 64qam 128 no 0xF 0xC8 0x152 0 20 yes yes 192 qpsk0 no

```

Router# **show cable modulation-profile 241**

| Mod | IUC     | Type  | Pre len | Diff enco | FEC T | FEC k | Scramb seed | Max B | Guard time | Last CW | Scramb | Pre offst | Pre Type | RS |
|-----|---------|-------|---------|-----------|-------|-------|-------------|-------|------------|---------|--------|-----------|----------|----|
|     |         |       |         |           | BYTE  | BYTE  | siz         | size  |            | short   |        |           |          |    |
| 241 | request | qpsk  | 68      | no        | 0x0   | 0x10  | 0x152       | 0     | 8          | no      | yes    | 0         | qpsk0    | no |
| 241 | initial | qpsk  | 2       | no        | 0x0   | 0x10  | 0x0         | 0     | 0          | no      | no     | 0         | qpsk1    | no |
| 241 | station | qpsk  | 128     | no        | 0x5   | 0x22  | 0x152       | 0     | 48         | no      | yes    | 0         | qpsk0    | no |
| 241 | a-short | 32qam | 160     | no        | 0x9   | 0x4C  | 0x152       | 6     | 8          | yes     | yes    | 0         | qpsk1    | no |
| 241 | a-long  | 64qam | 132     | no        | 0xC   | 0xE7  | 0x152       | 0     | 8          | yes     | yes    | 0         | qpsk1    | no |
| 241 | a-ugs   | 16qam | 80      | no        | 0x3   | 0xE7  | 0x152       | 0     | 8          | yes     | yes    | 0         | qpsk1    | no |

Router#

The following shows sample output for the **upstream** option, which displays the modulation profile currently being used by a particular upstream:

Router# **show cable modulation-profile cable 4/1 upstream 1**

| Mod | IUC     | Type | Pre len | Diff enco | FEC T | FEC k | Scramb seed | Max B | Guard time | Last CW | Scramb | Pre offst | Pre Type | RS |
|-----|---------|------|---------|-----------|-------|-------|-------------|-------|------------|---------|--------|-----------|----------|----|
|     |         |      |         |           | BYTE  | BYTE  | siz         | size  |            | short   |        |           |          |    |
| 41  | request | qpsk | 64      | no        | 0x0   | 0x10  | 0x152       | 0     | 8          | no      | yes    | 396       | qpsk     | na |
| 41  | initial | qpsk | 128     | no        | 0x5   | 0x22  | 0x152       | 0     | 48         | no      | yes    | 6         | qpsk     | na |
| 41  | station | qpsk | 128     | no        | 0x5   | 0x22  | 0x152       | 0     | 48         | no      | yes    | 6         | qpsk     | na |
| 41  | short   | qpsk | 88      | no        | 0x5   | 0x4C  | 0x152       | 35    | 42         | yes     | yes    | 396       | qpsk     | na |
| 41  | long    | qpsk | 76      | no        | 0x6   | 0xE8  | 0x152       | 135   | 143        | yes     | yes    | 396       | qpsk     | na |

Router#

The following example shows typical detailed output for an individual modulation profile that is displayed when using the **verbose** option. Each IUC is described in detail.

Router# **show cable modulation-profile 1 verbose**

```

Modulation Profile Number: 1
Burst: tdma
IUC: request (IUC 1)
Modulation: qpsk
Preamble length: 64
Differential Encoding: off
FEC parity T bytes: 0x0
FEC codeword length K bytes: 0x10
Scrambler seed: 0x152
Max short burst size B bytes: 0
Guard time size in symbols: 8
Shortened last codeword: no
Scrambler: enabled
Preamble offset: 184
Preamble type: qpsk0
RS interleaver on: na
RS interleaver depth: 0
RS interleaver block size: 0

Modulation Profile Number: 1
Burst: tdma
IUC: initial maintenance (IUC 3)
Modulation: qpsk

```

```

Preamble length: 128
Differential Encoding: off
FEC parity T bytes: 0x5
FEC codeword length K bytes: 0x22
Scrambler seed: 0x152
Max short burst size B bytes: 0
Guard time size in symbols: 48
Shortened last codeword: no
Scrambler: enabled
Preamble offset: 0
Preamble type: qpsk0
RS interleaver on: na
RS interleaver depth: 0
RS interleaver block size: 0

Modulation Profile Number: 1
Burst: tdma
IUC: station maintenance (IUC 4)
Modulation: qpsk
Preamble length: 128
Differential Encoding: off
FEC parity T bytes: 0x5
FEC codeword length K bytes: 0x22
Scrambler seed: 0x152
Max short burst size B bytes: 0
Guard time size in symbols: 48
Shortened last codeword: no
Scrambler: enabled
Preamble offset: 0
Preamble type: qpsk0
RS interleaver on: na
RS interleaver depth: 0
RS interleaver block size: 0

Modulation Profile Number: 1
Burst: tdma
IUC: short grant (IUC 5)
Modulation: qpsk
Preamble length: 72
Differential Encoding: off
FEC parity T bytes: 0x5
FEC codeword length K bytes: 0x4B
Scrambler seed: 0x152
Max short burst size B bytes: 6
Guard time size in symbols: 8
Shortened last codeword: yes
Scrambler: enabled
Preamble offset: 176
Preamble type: qpsk0
RS interleaver on: na
RS interleaver depth: 0
RS interleaver block size: 0

Modulation Profile Number: 1
Burst: tdma
IUC: long grant (IUC 6)
Modulation: qpsk
Preamble length: 80
Differential Encoding: off
FEC parity T bytes: 0x8
FEC codeword length K bytes: 0xDC
Scrambler seed: 0x152
Max short burst size B bytes: 0
Guard time size in symbols: 8

```

# show cable modulation-profile

```

Shortened last codeword: yes
Scrambler: enabled
Preamble offset: 168
Preamble type: qpsk0
RS interleaver on: na
RS interleaver depth: 0
RS interleaver block size: 0

```

Router#

Table 0-139 describes the significant fields displayed by the **show cable modulation-profile** command.

**Table 0-139** *show cable modulation-profile Field Descriptions*

| Field           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mo              | Modulation profile group number. A modulation profile group is the set of burst profiles that defines upstream transmit characteristics for the various types of upstream transmission classes.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| IUC             | Interval usage code. Each upstream transmit burst belongs to a class that is given a number called the interval usage code (IUC). Bandwidth maps messages (MAP) by IUC codes used to allocate upstream time slots. The following types are currently defined: <ul style="list-style-type: none"> <li>Request—Bandwidth request slot</li> <li>Request Data—Bandwidth request and short data burst slot</li> <li>Initial Maintenance—Initial link registration contention slot</li> <li>Station Maintenance—Link keepalive slot</li> <li>Short Data Grant—Short data burst slot</li> <li>Long Data Grant—Long data burst slot</li> </ul> |
| Type            | Modulation type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Preamb length   | Preamble length.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Diff enco       | Differential encoding enabled (yes) or not enabled (no).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| FEC T bytes     | Number of bytes that can be corrected for each forward error correction (FEC) code word.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| FEC CW size     | Size, in bytes, of the FEC code word.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Scrambl seed    | Scrambler seed value in hex format.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Max B size      | Maximum burst size.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Guard time size | Time between successive bursts measured in symbols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Last CW short   | Handling of FEC for shortened last code word.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Scrambl         | Scrambler enabled (yes) or not enabled (no).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Preamb offset   | (DOCSIS 1.0 and DOCSIS 1.1 modulation profiles) The bits to be used for the preamble value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Pre offst       | (DOCSIS 2.0 modulation profiles) The bits to be used for the preamble value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Pre Type        | (DOCSIS 2.0 modulation profiles) The A-TDMA preamble type (qpsk0 or qpsk1).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| RS              | (DOCSIS 2.0 modulation profiles) The A-TDMA RS encoding type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |


**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                  | Description                                               |
|------------------------------------------|-----------------------------------------------------------|
| <b>cable upstream modulation-profile</b> | Configures a spectrum group to use a specified frequency. |
| <b>show cable hop</b>                    | Displays CM configuration settings.                       |
| <b>show interface cable sid</b>          | Displays cable interface information.                     |

# show cable multicast authorization

To display the list of defined multicast authorization profiles and all CMs associated with corresponding profiles, use the **show cable multicast authorization** command in privileged EXEC mode.

```
show cable multicast authorization {profile-group {profile-group-number | all} profile-list
 {profile-number | all} }
```

|                    |                             |                              |
|--------------------|-----------------------------|------------------------------|
| Syntax Description | <b>profile-group</b>        | Displays the profile group.  |
|                    | <i>profile-group-number</i> | Displays the profile number. |
|                    | <b>all</b>                  | Displays all profile groups. |
|                    | <b>profile-list</b>         | Displays the profile list.   |
|                    | <i>profile-number</i>       | Displays the profile number. |
|                    | <b>all</b>                  | Displays all profiles.       |

**Command Default** No default behavior or values.

**Command Modes** Privileged EXEC (#)

|                 |                |                                                                                           |
|-----------------|----------------|-------------------------------------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                                                       |
|                 | 12.2(33)SCB    | This command was introduced.                                                              |
|                 | 12.2(33)SCC    | The command output was modified to display profile description for the specified profile. |

**Usage Guidelines** Use this command to display all the profile groups, profile descriptions, and CMs associated with the profiles.

**Examples** The following command shows all the profile groups and rules associated with it:

```
Router# show cable multicast authorization profile-group all
Profile-Group Index: 1
 CMs using this group: 2

 ProfileId CMs Profile

 0 2 prof1
 1 2 prof2
 2 2 prof3

Session-Rule List:
 Group / Source Prio Action

 grp: FF15::1/64 1 permit
 src: 0::0/0
```



```

grp: FF15::1/64 1 permit
src: 1234::1/64

grp: 224.1.1.1/16 1 permit
src: 0.0.0.0/0

grp: FF16::1/64 1 permit
src: 0::0/0

grp: 224.1.1.1/16 1 permit
src: 1.1.1.1/16

```

The following command shows a particular profile group and rules associated with it:

```

Router# show cable multicast authorization profile-group 1
Profile-Group Index: 1
 CMs using this group: 2

```

| ProfileId | CMs | Profile |
|-----------|-----|---------|
| 0         | 2   | prof1   |
| 1         | 2   | prof2   |
| 2         | 2   | prof3   |

Session-Rule List:

| Group / Source                       | Prio | Action |
|--------------------------------------|------|--------|
| grp: FF15::1/64<br>src: 0::0/0       | 1    | permit |
| grp: FF15::1/64<br>src: 1234::1/64   | 1    | permit |
| grp: 224.1.1.1/16<br>src: 0.0.0.0/0  | 1    | permit |
| grp: FF16::1/64<br>src: 0::0/0       | 1    | permit |
| grp: 224.1.1.1/16<br>src: 1.1.1.1/16 | 1    | permit |

The following command shows all the profiles and their profile descriptions, and the session rules for each profile.

```

Router# show cable multicast authorization profile-list all
CMTS Authorization Profile List

```

Profile-Index: 0 Name: prof1

Number of CMs: 2

| Id | Group / Source                      | Prio | Action |
|----|-------------------------------------|------|--------|
| 1  | grp: FF15::1/64<br>src: 0::0/0      | 1    | permit |
| 2  | grp: FF15::1/64<br>src: 1234::1/64  | 1    | permit |
| 3  | grp: 224.1.1.1/16<br>src: 0.0.0.0/0 | 1    | permit |

## ■ show cable multicast authorization

```

4 grp: FF16::1/64 1 permit
 src: 0::0/0

5 grp: 224.1.1.1/16 1 permit
 src: 1.1.1.1/16

Profile-Index: 1 Name: prof2
Number of CMs: 2
Id Group / Source Prio Action

Profile-Index: 2 Name: prof3
Number of CMs: 2
Id Group / Source Prio Action


```

The following command shows a particular profile and its description.

```

Router# show cable multicast authorization profile-list 3
CMTS Authorization Profile List

Profile-Index: 3 Name: gold
Number of CMs: 0
Profile Description: gold profile for higher bandwidth
Id Group / Source Prio Action


```

[Table 118](#) describes the significant fields shown in the display.

**Table 140**      *show cable multicast authorization Field Descriptions*

| Field               | Description                                                      |
|---------------------|------------------------------------------------------------------|
| Profile-Group Index | Displays the profile group index.                                |
| Name                | Displays the name of the profile group.                          |
| Profile Description | Displays the description given to the profile.                   |
| ProfileId           | Displays the QoS profile being used.                             |
| CMs                 | Displays the CMs belonging to the profile.                       |
| Profile             | Displays the profile being used for multicast.                   |
| Session-Rule List   | Displays the list of session rules being used for the multicast. |
| Source (src)        | Displays the source IP address.                                  |
| Group (grp)         | Displays the group IP address.                                   |
| Priority            | Displays the rule priority value.                                |
| Action              | Displays the action taken for multicast.                         |

#### Related Commands

| Command                                           | Description                                                                           |
|---------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>cable multicast auth enable default-action</b> | Configures cable multicast authorization profile and sets the maximum sessions limit. |
| <b>cable multicast auth profile-name</b>          | Configures cable multicast authorization profile.                                     |

| Command                          | Description                                                                                                 |
|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>profile description</b>       | Configures profile descriptions for each profile in the selected cable multicast authorization profile.     |
| <b>show cable multicast db</b>   | Displays the contents of multicast explicit tracking database.                                              |
| <b>show cable multicast dsid</b> | Displays the entire DSID database content.                                                                  |
| <b>show cable multicast qos</b>  | Displays the configuration information for MQoS, (Group-Config, Group-QoS-Config, Group-Encryption-Config). |

# show cable multicast db

To display the contents of the multicast explicit tracking database, use the **show cable multicast db** command in privileged EXEC mode.

```
show cable multicast db [bundle bundle-interface [ipv4-address | ipv6-address | summary] |
 cm-mac [host-mac-add | hosts | proxy] | summary | client pcmm] | [detail]
```

|                    |                         |                                                                                                       |
|--------------------|-------------------------|-------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>bundle</b>           | (Optional) Displays the bundle interface.                                                             |
|                    | <i>bundle-interface</i> | For example, Bundle 10.                                                                               |
|                    | <i>ipv4-address</i>     | (Optional) IPv4 address.                                                                              |
|                    | <i>ipv6-address</i>     | (Optional) IPv6 address of the group that should be matched using the format X:X:X:X:X.               |
|                    | <i>cm-mac</i>           | (Optional) MAC address of the cable modem.                                                            |
|                    | <i>host-mac-add</i>     | (Optional) Host MAC address.                                                                          |
|                    | <b>hosts</b>            | (Optional) Displays host details.                                                                     |
|                    | <b>proxy</b>            | (Optional) Displays proxy details.                                                                    |
|                    | <b>summary</b>          | (Optional) Displays the bundle interface summary or the multicast explicit tracking database summary. |
|                    | <b>client</b>           | (Optional) Displays entries by the client type.                                                       |
|                    | <b>pcmm</b>             | (Optional) Displays all PacketCable multimedia (PCMM) client entries.                                 |
|                    | <b>detail</b>           | (Optional) Displays additional information related to the multicast explicit tracking database.       |

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                                                                                                                                                                        |
|-----------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                                                                                                                                    |
|                 | 12.2(33)SCB    | This command was introduced.                                                                                                                                           |
|                 | 12.2(33)SCE    | This command was modified. The following two keywords were added to this command: <ul style="list-style-type: none"> <li><b>client</b></li> <li><b>pcmm</b></li> </ul> |
|                 | 12.2(33)SCF    | This command was modified. A new keyword, <b>detail</b> , was added to provide additional information related to the multicast explicit tracking database.             |

**Usage Guidelines**

Starting with Cisco IOS Release 12.2(33)SCF:

- There is an Explicit Tracking Database (ETDB) entry for each static multicast configuration.
- The total number of replications supported on each chassis is restricted to a maximum of 5000 replications.
- The total number of replications corresponding to static multicast is restricted to a maximum of 1500 replications.
- The **show cable multicast db detail** command is not applicable for ETDB entries created by the static TLV.

**Examples**

The following is a sample output from the **show cable multicast db** command:

```
Router# show cable multicast db

Interface : Bundle1
Session (S,G) : (*,230.1.1.1)
Fwd Intfc Sub Intfc Host Intfc CM Mac Hosts
w1/0/0:0 aaaa.bbbb.cccc 2
w1/0/0:0 aaaa.bbbb.cccc 2

Session (S,G) : (255.255.255.255,255.255.255.255)
Fwd Intfc Sub Intfc Host Intfc CM Mac Hosts
w1/0/0:0 aabb.bbcc.ccdd 3

Interface : Bundle2
Session (S,G) : (*,230.1.1.1)
Fwd Intfc Sub Intfc Host Intfc CM Mac Hosts
w1/0/0:0 aaaa.bbbb.cccc 2
w1/0/0:0 aaaa.bbbb.cccc 2

Session (S,G) : (255.255.255.255,255.255.255.255)
Fwd Intfc Sub Intfc Host Intfc CM Mac Hosts
w1/0/0:0 aabb.bbcc.ccdd 3
```

The following is a sample output from the **show cable multicast db summary** command:

```
Router# show cable multicast db summary

Interface Session Count CM Count
Bundle1 10 5
Bundle2 23 11
```

The following is a sample output from the **show cable multicast db bundle bundle-interface** command:

```
Router# show cable multicast db bundle 1

Interface : Bundle1
Session (S,G) : (*,230.1.2.3)
Fwd Intfc Sub Intfc Host Intfc CM Mac Hosts
Wi1/1/0:0 Bundle1 Ca5/0/0 ff01.0001.0000 1

Interface : Bundle1
Session (S,G) : (20.1.1.1,232.1.1.1)
Fwd Intfc Sub Intfc Host Intfc CM Mac Hosts
Wi1/1/0:0 Bundle1 Ca5/0/0 ff01.0001.0000 1
```

The following is a sample output from the **show cable multicast db bundle *bundle-interface* summary** command:

```
Router# show cable multicast db bundle 1 summary
```

| Interface | Session Count | CM Count |
|-----------|---------------|----------|
| Bundle1   | 10            | 5        |

The following is a sample output from the **show cable multicast db bundle *bundle-interface* ipv4-address** command:

```
Router# show cable multicast db bundle 1 225.0.0.1
```

```
Session (S,G) : (*,225.0.0.1)
Fwd Intfc Sub Intfc Host Intfc CM Mac Hosts
Wi5/1:0 Bundle1 Ca5/1 001e.6bfb.29a6 1
```

The following is a sample output from the **show cable multicast db bundle *bundle-interface* ipv6-address** command:

```
Router# show cable multicast db bundle1 ff15::1
```

```
Session (S,G) : (*,FF15::1)
Fwd Intfc Sub Intfc Host Intfc CM Mac Hosts
In5/1:0 Bundle1 Ca5/1 001e.6bfb.29a6 1
```

The following is a sample output from the **show cable multicast db *cm-mac*** command:

```
Router# show cable multicast db 000f.66f9.aa73
```

```
Session (S,G) : (*,230.1.1.1)
Fwd Intfc Sub Intfc Host Intfc Hosts Proxy Static
w1/0/0:0 2 Y N
```

```
Session (S,G) : (*,230.1.1.1)
Fwd Intfc Sub Intfc Host Intfc Hosts Proxy Static
w1/0/0:0
```

The following is a sample output from the **show cable multicast db *cm-mac* host-mac-add** command:

```
Router# show cable multicast db aaaa.bbbb.cccc 000f.66f9.aa73
```

```
Bundle Interface : Bundle1
CM mac :
Host mac : aaaa.bbbb.cccc
Session (S,G) : (*,230.1.1.1)
Fwd Interface :
Sub Interface :
Host Interface :
IGMP/MLD Ver :
TimeStamp Delta :
```

```
Bundle Interface : Bundle1
CM mac :
Host mac : aaaa.bbbb.cccc
Session (S,G) : (*,230.1.1.1)
Fwd Interface :
Sub Interface :
Host Interface :
IGMP/MLD Ver :
TimeStamp Delta :
```

The following is a sample output from the **show cable multicast db *cm-mac* hosts** command:

```
Router# show cable multicast db aaaa.bbbb.cccc hosts

Session (S,G) : (*,230.1.1.1)
Fwd Intfc Sub Intfc Host Intfc Host Mac Proxy
w1/0/0:0 aaaa.bbbb.cccc Y

Session (S,G) : (255.255.255.255,255.255.255.255)
Fwd Intfc Sub Intfc Host Intfc Host Mac Proxy
w1/0/0:0 aabb.bbcc.cccd N
```

The following is a sample output from the **show cable multicast db *cm-mac* proxy** command:

```
Router# show cable multicast db aaaa.bbbb.cccc proxy

Bundle Interface : Bundle1
CM mac :
Host mac : aaaa.bbbb.cccc
Session (S,G) : (*,230.1.1.1)
Fwd Interface :
Sub Interface :
Host Interface :
IGMP/MLD Ver :
TimeStamp Delta :

Bundle Interface : Bundle1
CM mac :
Host mac : aaaa.bbbb.cccc
Session (S,G) : (*,230.1.1.1)
Fwd Interface :
Sub Interface :
Host Interface :
IGMP/MLD Ver :
TimeStamp Delta :
```

The following is a sample output from the **show cable multicast db** command that displays all the available PCMM client entries on a Cisco CMTS router:

```
Router# show cable multicast db client pcmm

Interface : Bundle1
Session (S,G) : (*,229.2.2.12)
Fwd Intf Bundle Intf Host Intf CM MAC CPE IP Gate-ID SFID
Wi1/1/0:0 Bundle1 Ca5/0/0 0018.6852.8056 60.1.1.202 1344
```

The following is a sample output from the **show cable multicast db** command with the **detail** keyword in Cisco IOS Release 12.2(33)SCF:

```
Router# show cable multicast db detail
```

```
Interface Fwd Intfc group source
Bundle1 Wi7/0/0:0 230.1.2.4 N/A
ETDB received IGMP ETDB processed IGMP
Nov 25 08:42:36.643 Nov 25 08:42:36.643
Sid gc_id Stat Index DSID Stat Index Allocated
DEFAULT N/A 61330 0xCF25C Nov 25 08:42:36.643
8201 1 61331 0xCF25C Nov 25 08:42:36.643
```

```
Interface Fwd Intfc group source
Bundle1 Wi7/0/0:0 230.1.2.3 N/A
ETDB received IGMP ETDB processed IGMP
Nov 25 08:42:22.339 Nov 25 08:42:22.339
Sid gc_id Stat Index DSID Stat Index Allocated
DEFAULT N/A 61328 0xCF25B Nov 25 08:42:22.339
8201 1 61329 0xCF25B Nov 25 08:42:22.339
```

The following is a sample output from the **show cable multicast db** command with the **detail** keyword that provides multicast explicit tracking database information for a particular bundle interface in Cisco IOS Release 12.2(33)SCF:

```
Router# show cable multicast db bundle 1 detail
```

```
Interface Fwd Intfc group source
Bundle1 Wi7/0/0:0 230.1.2.4 N/A
ETDB received IGMP ETDB processed IGMP
Nov 25 08:42:36.643 Nov 25 08:42:36.643
Sid gc_id Stat Index DSID Stat Index Allocated
DEFAULT N/A 61330 0xCF25C Nov 25 08:42:36.643
8201 1 61331 0xCF25C Nov 25 08:42:36.643
```

```
Interface Fwd Intfc group source
Bundle1 Wi7/0/0:0 230.1.2.3 N/A
ETDB received IGMP ETDB processed IGMP
Nov 25 08:42:22.339 Nov 25 08:42:22.339
Sid gc_id Stat Index DSID Stat Index Allocated
DEFAULT N/A 61328 0xCF25B Nov 25 08:42:22.339
8201 1 61329 0xCF25B Nov 25 08:42:22.339
```

The following is a sample output from the **show cable multicast db** command with the **detail** keyword that provides multicast explicit tracking database information for a particular bundle interface based on its host MAC address in Cisco IOS Release 12.2(33)SCF:

```
Router# show cable multicast db bundle 1 230.1.2.4 detail
```

```
Interface Fwd Intfc group source
Bundle1 Wi7/0/0:0 230.1.2.4 N/A
ETDB received IGMP ETDB processed IGMP
Nov 25 08:42:36.643 Nov 25 08:42:36.643
Sid gc_id Stat Index DSID Stat Index Allocated
DEFAULT N/A 61330 0xCF25C Nov 25 08:42:36.643
8201 1 61331 0xCF25C Nov 25 08:42:36.643
```



The following is a sample output from the **show cable multicast db** command with the **detail** keyword that provides multicast explicit tracking database information based on its cable modem MAC address in Cisco IOS Release 12.2(33)SCF:

```
Router# show cable multicast db 0019.474a.d516 detail
```

```
Interface Fwd Intfc group source
Bundle1 Wi7/0/0:0 230.1.2.3 N/A
ETDB received IGMP ETDB processed IGMP
Nov 25 08:42:22.339 Nov 25 08:42:22.339
Sid gc_id Stat Index DSID Stat Index Allocated
DEFAULT N/A 61328 0xCF25B Nov 25 08:42:22.339
8201 1 61329 0xCF25B Nov 25 08:42:22.339

Interface Fwd Intfc group source
Bundle1 Wi7/0/0:0 230.1.2.4 N/A
ETDB received IGMP ETDB processed IGMP
Nov 25 08:42:36.643 Nov 25 08:42:36.643
Sid gc_id Stat Index DSID Stat Index Allocated
DEFAULT N/A 61330 0xCF25C Nov 25 08:42:36.643
8201 1 61331 0xCF25C Nov 25 08:42:36.643
```

Table 141 describes the significant fields shown in the **show cable multicast db** command display.

**Table 141** *show cable multicast db Field Descriptions*

| Field            | Description                                                                               |
|------------------|-------------------------------------------------------------------------------------------|
| Bundle Interface | Bundle interface number.                                                                  |
| CM Mac           | MAC address of the CM.                                                                    |
| Host Mac         | Host MAC address.                                                                         |
| Fwd Intfc        | Forwarding interface name.                                                                |
| Sub Intfc        | Sub-interface name.                                                                       |
| Host Intfc       | Host interface name.                                                                      |
| IGMP/MLD Ver     | IPv4 or IPv6 multicast group signaling protocols.<br>IPv4: IGMPv1/v2/v3<br>IPv6: MLDv1/v2 |
| TimeStamp Delta  | Timestamp of the session.                                                                 |
| Hosts            | Hosts behind the CM.                                                                      |
| CPE IP           | IP address of the CPE.                                                                    |
| Gate-ID          | Unique number identifying the local PCMM multicast gate.                                  |
| SFID             | Service flow ID (SFID) for the downstream associated with this PCMM multicast gate.       |

| Related Commands | Command                                   | Description                                                                                                                    |
|------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>show cable multicast authorization</b> | Displays the list of defined multicast authorization profiles and all cable modems associated with the corresponding profiles. |
|                  | <b>show cable multicast dsid</b>          | Displays the entire multicast downstream service identifier (DSID) database content.                                           |
|                  | <b>show cable multicast qos</b>           | Displays the configuration information of the MQoS (Group-Config, Group-QoS-Config, Group-Encryption-Config).                  |
|                  | <b>show packetcable gate multimedia</b>   | Displays the information about the total number of PCMM multicast gates.                                                       |

# show cable multicast debug

To display information about debug counters, use the **show cable multicast debug** command in privileged EXEC mode.

**show cable multicast debug** [**etdb** [*multicast-group-address* | *mac-address*]]

| Syntax                         | Description                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------|
| <b>etdb</b>                    | (Optional) Displays information about multicast explicit tracking database debug counters. |
| <i>multicast-group-address</i> | (Optional) IP address of the multicast group.                                              |
| <i>mac-address</i>             | (Optional) MAC address of the cable modem.                                                 |

**Command Default** None

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

**Usage Guidelines**

The **show cable multicast debug** command provides information only about the explicit tracking database counter in Cisco IOS Release 12.2(33)SCE and later. This means that the command output does not include other debug counters such as multicast authorization and multicast quality of service (QoS).

If you want to verify multicast group specific or MAC specific debug counters, you must turn on debugging of multicast counters using the **debug cable multicast counter start** command before using the **show cable multicast debug** command.



## Note

The command output will be the same if you run the **show cable multicast debug** command with or without the keyword **etdb** in Cisco IOS Release 12.2(33)SCE, because this command does not support any other debug counters in Cisco IOS Release 12.2(33)SCE.

Examples

The following is a sample output of the **show cable multicast debug** command that displays information about multicast explicit tracking database debug counters on the Cisco uBR10012 router:

```
Router# show cable multicast debug

ETDB
counter value
et_ses_update 3
et_ses_delete 0
et_cm_delete 0
et_post_host_add 1
et_post_cm_add 1
et_post_ses_intfcs_update 3
et_post_ses_intfcs_delete 0
et_post_cm_delete 0
et_post_host_delete 0
```

The following is a sample output of the **show cable multicast debug** command that displays information about multicast explicit tracking database debug counters based on a particular multicast group:

```
Router# show cable multicast debug etdb 230.1.1.1

ETDB GROUP:230.1.1.1
counter value
et_ses_update 3
et_ses_delete 0
et_post_host_add 1
et_post_cm_add 1
et_post_ses_intfcs_update 3
et_post_ses_intfcs_delete 0
et_post_cm_delete 0
et_post_host_delete 0
```

The following is a sample output of the **show cable multicast debug** command that displays information about multicast explicit tracking database debug counters based on a particular cable modem:

```
Router# show cable multicast debug etdb 001a.c3ff.d41a

ETDB CM:001a.c3ff.d41a
counter value
et_ses_update 2
et_ses_delete 0
et_cm_delete 0
et_post_host_add 0
et_post_cm_add 0
et_post_ses_intfcs_update 2
et_post_cm_delete 0
et_post_host_delete 0
```

Table 89 describes the major fields shown in the **show depi** command display:

**Table 142** show cable multicast debug Field Descriptions

| Field   | Description                                 |
|---------|---------------------------------------------|
| ETDB    | Multicast explicit tracking database        |
| counter | Debug counters for the multicast operation. |
| value   | Debug counter values.                       |

**Table 142** *show cable multicast debug Field Descriptions (continued)*

| Field      | Description                                                                            |
|------------|----------------------------------------------------------------------------------------|
| ETDB GROUP | Identifies a particular multicast group for explicit tracking database debug counters. |
| ETDB CM    | Identifies a particular cable modem for explicit tracking database debug counters.     |

**Related Commands**

| Command                                    | Description                                                                                                              |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>debug cable multicast counter clear</b> | Resets debugging of multicast counters.                                                                                  |
| <b>debug cable multicast counter start</b> | The Cisco CMTS router starts collecting multicast debug counters based on a particular multicast group or a cable modem. |
| <b>debug cable multicast counter stop</b>  | The Cisco CMTS router stops collecting multicast debug counters.                                                         |

# show cable multicast dsid

To display the entire multicast downstream service identifier (DSID) database content, use the **show cable multicast dsid** command in privileged EXEC mode.

## Cisco uBR7246VXR and Cisco uBR7225VXR Routers

```
show cable multicast dsid [dsid | ip-address [source-ip] | integrated-cable
slot/port:integrated-channel {dynamic | static}| wideband-cable slot/port:wideband-channel
{dynamic} | ipv6-address]
```

## Cisco uBR10012 Router

```
show cable multicast dsid [dsid | ip-address [source-ip] | integrated-cable
slot/sub-slot/port:integrated-channel {dynamic | static}| wideband-cable
slot/bay/port:wideband-channel {dynamic | static} | ipv6-address]
```

### Syntax Description

|                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>dsid</i>                                                             | (Optional) Downstream service identifier.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>ip-address</i>                                                       | (Optional) IP address of the group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>source-ip</i>                                                        | (Optional) IP address of the source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>integrated-cable</b><br><i>slot/sub-slot/port:integrated-channel</i> | (Optional) Identifies the cable interface on the router for which information should be displayed. The valid values are: <ul style="list-style-type: none"> <li><i>slot</i>—0 to 8 on the Cisco uBR10012 router, 3 to 6 on the Cisco uBR7246VXR router, and 1 or 2 on the Cisco uBR7225VXR router.</li> <li><i>sub-slot</i>—0 or 1</li> <li><i>port</i>—0 to 4 on the Cisco uBR10012 router and 0 or 1 on the Cisco uBR7246VXR and Cisco uBR7225VXR routers.</li> <li><i>integrated-channel</i>—0 to 3</li> </ul> |
| <b>wideband-cable</b><br><i>slot/bay/port:wideband-channel</i>          | (Optional) Identifies the wideband interface on the router for which information should be displayed. The valid values are: <ul style="list-style-type: none"> <li><i>slot</i>—0 to 8 on the Cisco uBR10012 router, 3 to 6 on the Cisco uBR7246VXR router, and 1 or 2 on the Cisco uBR7225VXR router.</li> <li><i>bay</i>—0 or 1</li> <li><i>port</i>—0 to 4 on the Cisco uBR10012 router and 0 or 1 on the Cisco uBR7246VXR and Cisco uBR7225VXR routers.</li> <li><i>wideband-channel</i>—0 to 5</li> </ul>     |
| <b>dynamic</b>                                                          | Identifies the dynamic DSIDs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>static</b>                                                           | Identifies the static DSIDs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>ipv6-address</i>                                                     | IPv6 address of the group that should be matched using the format X:X:X:X::X.                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### Command Default

None

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                      |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCB | This command was introduced.                                                                                                                                                      |
|                 | 12.2(33)SCC | This command was modified to display all the SIP and SPA indexes assigned for a multicast session.                                                                                |
|                 | 12.2(33)SCD | This command was modified. Support for Cisco uBR7246VXR and Cisco uBR7225VXR routers were added. Two new keywords, <b>dynamic</b> and <b>static</b> , were added to this command. |

**Usage Guidelines** Use this command to display the DSID database content and SIP and SPA indexes assigned for a multicast session.

**Examples** The following example shows a sample output for the **show cable multicast dsid** command:

```
Router# show cable multicast dsid
```

```

Multicast Group : 230.1.2.3
 Source : *
 IDB : Bu2 Interface: Mo1/1/0:0 Dsid: 0x1F078
 StatIndex : 2 SAID: DEFAULT
Multicast Group : 230.1.2.3
 Source : *
 IDB : Bu2 Interface: Mo1/1/0:0 Dsid: 0x1F078
 StatIndex : 3 SAID: 8196
Multicast Group : 230.1.2.3
 Source : *
 IDB : Bu2 Interface: Mo1/1/0:0 Dsid: 0x1F078
 StatIndex : 4 SAID: 8197
```

#### Example of the show cable multicast dsid ip-address Command Output That Shows the DSID Entry With Matching Multicast Session for the Cisco uBR7246VXR and Cisco uBR7225VXR routers in Cisco IOS Release 12.2(33)SCD

The following example shows a sample output for the **show cable multicast dsid ip-address [source-ip]** command:

```
Router# show cable multicast dsid 225.0.0.1
```

```

Multicast Group : 225.0.0.1
 Source : *
 IDB : Bu1 Interface: Wi5/0:0 Dsid: 0x5F078
 StatIndex : 7 SAID : DEFAULT
Multicast Group : 225.0.0.1
 Source : *
 IDB : Bu1 Interface: Wi5/0:0 Dsid: 0x5F078
 StatIndex : 8 SAID : 8195 GC : 1
```

**Example of the show cable multicast dsid wideband-Cable Command Output That Displays the Dynamic or Preallocated Static DSID Created on a Particular Interface for the Cisco uBR7246VXR and Cisco uBR7225VXR routers in Cisco IOS Release 12.2(33)SCD**

The following example shows a sample output for the **show cable multicast dsid wideband-Cable [dynamic | static]** command:

```
Router# show cable multicast dsid wideband-Cable 5/0:0 dynamic

Multicast Group : 225.0.0.1
 Source : *
 IDB : Bu1 Interface: Wi5/0:0 Dsid: 0x5F078
 StatIndex : 7 SAID : DEFAULT
Multicast Group : 225.0.0.1
 Source : *
 IDB : Bu1 Interface: Wi5/0:0 Dsid: 0x5F078
 StatIndex : 8 SAID : 8195 GC : 1
Multicast Group : 225.0.0.2
 Source : *
 IDB : Bu1 Interface: Wi5/0:0 Dsid: 0x5F079
 StatIndex : 9 SAID : DEFAULT
Multicast Group : 225.0.0.2
 Source : *
 IDB : Bu1 Interface: Wi5/0:0 Dsid: 0x5F079
 StatIndex : 10 SAID : 8196 GC : 1
```

**Example of the show cable multicast dsid integrated-Cable Command Output That Displays the Dynamic DSID Created on a Particular Interface for the Cisco uBR7246VXR and Cisco uBR7225VXR routers in Cisco IOS Release 12.2(33)SCD**

The following example shows a sample output for the **show cable multicast dsid integrated-Cable static** command:

```
Router# show cable multicast dsid integrated-Cable 5/0:0 static

Dsid Stat Index Type

0x5F000 65384 IGMPv1/v2
0x5F001 65385 IGMPv3
0x5F002 65386 MLDv1
0x5F003 65387 MLDv2
0x5F004 65388 PreReg
```

[Table 143](#) describes the significant fields shown in the **show cable multicast dsid** command display.

**Table 143** *show cable multicast dsid Field Descriptions*

| Field           | Description                                     |
|-----------------|-------------------------------------------------|
| Multicast Group | Multicast group.                                |
| Source          | Source IP address.                              |
| IDB             | Interface description block number.             |
| Interface       | Interface name.                                 |
| Dsid            | Downstream service identifier.                  |
| StatIndex       | Blaze indexes assigned for a multicast session. |
| SAID            | Security Association Identifier.                |



## Related Commands

| Command                                   | Description                                                                                                       |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show cable multicast authorization</b> | Displays the list of defined multicast authorization profiles and all CMs associated with corresponding profiles. |
| <b>show cable multicast db</b>            | Displays the multicast explicit tracking database content.                                                        |
| <b>show cable multicast qos</b>           | Displays the configuration information for MQoS (Group-Config, Group-QoS-Config, Group-Encryption-Config).        |

# show cable multicast qos

To display the configuration information for multicast quality of service (MQoS), use the **show cable multicast qos** command in privileged EXEC mode.

```
show cable multicast qos {group-config [group-config-index] | group-encryption
 [group-encryption-index] | group-qos [group-qos-index]}
```

|                    |                               |                                                                              |
|--------------------|-------------------------------|------------------------------------------------------------------------------|
| Syntax Description | <b>group-config</b>           | Displays multicast group configuration information.                          |
|                    | <i>group-config-index</i>     | (Optional) Index for the multicast group. The valid range is from 1 to 2048. |
|                    | <b>group-encryption</b>       | Displays multicast group encryption information.                             |
|                    | <i>group-encryption-index</i> | (Optional) Index for the multicast group encryption.                         |
|                    | <b>group-qos</b>              | Displays multicast group QoS information.                                    |
|                    | <i>group-qos-index</i>        | (Optional) Index for the multicast group QoS.                                |

Command Default

None

Command Modes

Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                 |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCB | This command was introduced.                                                                                 |
|                 | 12.2(33)SCC | The command output was modified to display the application ID for default multicast group QoS configuration. |
|                 | 12.2(33)SCE | The command output was modified to list the PCMM application for multimedia multicast configuration.         |

**Examples****Example of the show cable multicast qos Command Output for Multicast Group Configuration**

The following example shows a sample output of the **show cable multicast qos** command that displays multicast group configuration information:

```
Router# show cable multicast qos group-config

Default Multicast Group-Qos Application ID 65535
Multiast Group Config 1 : Priority 1
Group QOS - 1
Group Encryption - 1
Application ID 65534
Session Range - Group Prefix 230.0.0.0 Mask 255.0.0.0 Source Prefix 0.0.0.0 Mask 0.0.0.0
```

**Example of the show cable multicast qos Command Output for Multicast Group Encryption**

The following example shows a sample output of the **show cable multicast qos** command that displays multicast group encryption information:

```
Router# show cable multicast qos group-encryption

Multicast Group Encryption 1 : Algorithm 56bit-des
Multicast Group Encryption 2 : Algorithm 128bit-aes
```

**Example of the show cable multicast qos Command Output for Multicast Group QoS**

The following example shows a sample output of the **show cable multicast qos** command that displays multicast group QoS information in Cisco IOS Release 12.2(33)SCC:

```
Router# show cable multicast qos group-qos

Group QOS Index Service Class Control Igmp Limit Override
DEFAULT MQOS_DEFAULT Aggregate NO-LIMIT 1 MQOS Aggregate NO-LIMIT
```

The following example shows a sample output of the **show cable multicast qos** command that displays multicast group QoS information including the application (the App field) for multimedia multicast configuration in Cisco IOS Release 12.2(33)SCE:

```
Router# show cable multicast qos group-qos

Group QOS Index Service Class Control Igmp Limit Override App
DEFAULT mcast_default Aggregate NO-LIMIT
1 SDV_SD Single --- No CLI
512 SDV_HD Single --- No PCMM
```

Table 118 describes the significant fields shown in the display.

**Table 144** *show cable multicast qos Field Descriptions*

| Field         | Description                                                                                       |
|---------------|---------------------------------------------------------------------------------------------------|
| Group         | Identifies the multicast group.                                                                   |
| QOS           | Identifies the QoS profile that is being enforced.                                                |
| Index         | Index number of the QoS group.                                                                    |
| Service Class | Identifies the service class being used for the multicast.                                        |
| Control       | Identifies the type of control.                                                                   |
| Igmp Limit    | Displays the Internet Group Management Protocol (IGMP) session limit for aggregate service flows. |

**Table 144** *show cable multicast qos Field Descriptions (continued)*

| Field    | Description                                                                         |
|----------|-------------------------------------------------------------------------------------|
| Override | Displays the additional IGMP session admitted and forwarded as best effort traffic. |
| App      | Displays the application used for multimedia multicast.                             |

**Related Commands**

| Command                                   | Description                                                                                                       |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show cable multicast authorization</b> | Displays the list of defined multicast authorization profiles and all CMs associated with corresponding profiles. |
| <b>show cable multicast db</b>            | Displays the contents of multicast explicit tracking database.                                                    |
| <b>show cable multicast dsid</b>          | Displays the entire Downstream Service Identifier (DSID) database content.                                        |

# show cable multicast ses-cache

To display the current multicast replication sessions cache information, use the **show cable multicast ses-cache** command in interface configuration and global configuration mode.

**show cable multicast ses-cache interface integrated-cable** *slot/subslot/port:rf-channel*  
[summary | verbose]

**show cable multicast ses-cache interface modular-cable** *slot/{subslot | bay}/port:interface-number* [summary | verbose]

**show cable multicast ses-cache interface wideband-cable** *slot/{subslot | bay}/port:wideband-channel* [summary | verbose]

**show cable multicast ses-cache global** [summary]

| Syntax Description                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>interface integrated-cable</b><br><i>slot/subslot/port:rf-channel</i>             | <p>Displays the multicast replication sessions cache information for a integrated-cable interface.</p> <p><i>slot</i>—Slot where a line card resides.</p> <p><i>subslot</i>—(Cisco uBR10012 only) Secondary slot number of a line card.</p> <p><i>port</i>—Downstream port number.</p> <p><i>rf:channel</i>—RF channel number.</p> <p><a href="#">Table 145</a> displays valid values for these arguments.</p>                                                                                                              |
| <b>interface modular-cable</b><br><i>slot/{subslot   bay}/port:interface-number</i>  | <p>Displays the multicast replication sessions cache information for a wideband-cable interface.</p> <p><i>slot</i>—Slot where a SPA interface processor (SIP) or a line card resides.</p> <p><i>subslot</i>—Secondary slot for a shared port adapter (SPA) or a line card.</p> <p><i>bay</i>—Bay in a SIP where a SPA is located.</p> <p><i>port</i>—Downstream port number.</p> <p><i>interface-number</i>—Modular cable interface number</p> <p><a href="#">Table 146</a> displays valid values for these arguments.</p> |
| <b>interface wideband-cable</b><br><i>slot/{subslot   bay}/port:wideband-channel</i> | <p>Displays the multicast replication sessions cache information for a wideband-cable interface.</p> <p><i>slot</i>—Slot where a SPA interface processor (SIP) or a line card resides.</p> <p><i>subslot</i>—Secondary slot for a shared port adapter (SPA) or a line card.</p> <p><i>bay</i>—Bay in a SIP where a SPA is located.</p> <p><i>port</i>—Downstream port number.</p> <p><i>wideband-channel</i>—Wideband channel number.</p> <p><a href="#">Table 147</a> displays valid values for these arguments.</p>       |
| <b>global</b>                                                                        | Displays the multicast replication sessions cache information at a global level.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>summary</b>                                                                       | Provides summarized information of the multicast replication sessions cache.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>verbose</b>                                                                       | Provides detailed information of the multicast replication session cache.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Command Modes**

Global configuration (config)  
Interface configuration (config-if)

**Command History**

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCH | This command was introduced. |

**Usage Guidelines**

The **show cable multicast ses-cache interface** and the **show cable multicast ses-cache global** displays the session cache information when multicast replication session cache is configured on the Cisco uBR10012 router. The **show cable multicast ses-cache global** command displays the cache information for all interfaces at the chassis level. The **show cable multicast ses-cache interface** displays the session cache information for a particular interface.

[Table 145](#) displays the valid values for an integrated-cable interface.

**Table 145 Integrated Cable Interface Density Information**

| CMTS Router      | Line Card          | Slot   | Subslot | Port   | RF Channel Number |
|------------------|--------------------|--------|---------|--------|-------------------|
| Cisco uBR10012   | Cisco uBR-MC3GX60V | 5 to 8 | 0 or 1  | 0 to 4 | 0 to 3            |
|                  | Cisco UBR-MC20X20V |        |         |        |                   |
|                  | Cisco uBR10-MC5X20 |        |         |        |                   |
| Cisco uBR7225VXR | All                | 1 or 2 | —       | 0 or 1 | —                 |
| Cisco uBR7246VXR | All                | 3 to 6 | —       | 0 or 1 | —                 |

[Table 146](#) displays the valid values for a modular cable interface.

**Table 146 Modular Cable Interface Density Information**

| Line Card                             | Slot   | Subslot             | Bay    | Port   | Interface Number |
|---------------------------------------|--------|---------------------|--------|--------|------------------|
| Cisco uBR-MC3GX60V                    | 5 to 8 | 0 or 1              | —      | 0 to 2 | 0 to 23          |
| Cisco UBR-MC20X20V                    |        |                     | —      | 0 to 5 |                  |
| Cisco Wideband SPA                    | —      | 0 or 1 <sup>1</sup> | 0 to 3 | 0      |                  |
| Cisco Wideband SIP /<br>Cisco SIP-600 | 1 or 3 | —                   | —      | —      |                  |

1. Applicable to SPAs when the SIP is in Slot1 or Slot 3. The subslot is not specified from Cisco IOS Release 12.2(33)SCB onwards.

[Table 147](#) displays the valid values for a wideband-cable interface.

**Table 147 Wideband Interface Density Information**

| CMTS Router      | Line Card                          | Slot   | Subslot             | Bay    | Port   | Wideband Channel |
|------------------|------------------------------------|--------|---------------------|--------|--------|------------------|
| Cisco uBR10012   | Cisco uBR-MC3GX60V                 | 5 to 8 | 0 or 1              | —      | 0 to 4 | 0 to 31          |
|                  | Cisco UBR-MC20X20V                 |        |                     | —      |        | 0 to 5           |
|                  | Cisco uBR10-MC5X20                 |        |                     | —      |        | —                |
|                  | Cisco Wideband SPA                 | —      | 0 or 1 <sup>1</sup> | 0 to 3 | 0      | —                |
|                  | Cisco Wideband SIP / Cisco SIP-600 | 1 or 3 | —                   | —      | —      | —                |
| Cisco uBR7225VXR | All                                | 1 to 2 | —                   | —      | 0 or 1 | 0 to 5           |
| Cisco uBR7246VXR | All                                | 3 to 6 | —                   | —      |        |                  |

1. Applicable to SPAs when the SIP is in Slot1 or Slot 3. The subslot is not specified from Cisco IOS Release 12.2(33)SCB onwards.

### Examples

The following example displays the multicast replication session cache information at the global level:

```
Router# show cable multicast ses-cache global
```

```

Fwd Intfc Sub Intfc Session (S,G)
Wi7/1/0:0 Bundle1 (30.30.30.30,227.0.0.20)
 Bundle1 (30.30.30.30,227.0.0.22)

Wi7/1/0:1 Bundle1 (30.30.30.30,226.0.0.20)
 Bundle1 (30.30.30.30,226.0.0.22)
 Bundle1 (30.30.30.30,226.0.0.23)
 Bundle1 (30.30.30.30,226.0.0.21)

Mo6/0/1:0 Bundle1 (*, 230.0.8.138)

In8/1/0:1 Bundle1 (*, 226.0.0.18)
```

The following example displays the multicast replication session cache at the wideband-cable interface:

```
Router# show cable multicast ses-cache interface wi7/1/0:1
```

```

Fwd Intfc Sub Intfc Session (S,G)
Wi7/1/0:1 Bundle1 (30.30.30.30,226.0.0.20)
 Bundle1 (30.30.30.30,226.0.0.22)
 Bundle1 (30.30.30.30,226.0.0.23)
 Bundle1 (30.30.30.30,226.0.0.21)
```

Table 148 describes the significant fields shown in the display.

**Table 148** *show cable multicast ses-cache Field Descriptions*

| Field         | Description                                                                                          |
|---------------|------------------------------------------------------------------------------------------------------|
| Fwd Intc      | Layer 2 forwarding interface such as interface cable, integrated-cable and wideband-cable interface. |
| Sub Intfc     | Sub interface.                                                                                       |
| Session (S,G) | Secondary multicast group.                                                                           |

The following example shows a summarized view of the multicast replication session cache information at the chassis level:

```
Router# show cable multicast ses-cache global summary
```

```
Global Cache Config: 20
```

```

Fwd Cache Cache Cache Cache
Intfc Config Used Missed Hitted
Wi7/1/0:1 10 4 4 12
Mo6/0/1:0 12 3 3 15
In8/1/0:1 100 1 1 0

```

```
Total
```

The following example is a summary of the multicast replication session cache at the wideband interface:

```
Router# show cable multicast ses-cache interface wi7/1/0:1 summary
```

```
Global Cache Config: 20
```

```

Fwd Cache Cache Cache Cache
Intfc Config Used Missed Hitted
Wi7/1/0:1 10 4 4 12

```

Table 149 describes the significant fields shown in the display.

**Table 149** *show cable multicast ses-cache summary Field Descriptions*

| Field        | Description                                                                    |
|--------------|--------------------------------------------------------------------------------|
| Fwd Intfc    | Layer 2 forwarding interface.                                                  |
| Cache Config | Multicast session cache value.                                                 |
| Cache Used   | No. of sessions used from cache.                                               |
| Cache Missed | No. of IGMP join sessions that were missed.                                    |
| Cache Hitted | No. of times the IGMP join session was matched with the reused cache sessions. |

The following example displays verbose information of the multicast replication session cache at the wideband interface:

```
Router# show cable multicast ses-cache wi8/0/0:0 verbose
```

```
Multicast Group : 232.10.0.8
```

```
Source : 100.0.0.2
```



```

Act GCRs : 1

Interface : Bu255 State: A GI: Bu255 RC: 0

GCR : GC SAID SFID Key GQC GEn
 10 8858 24 0 1 0

Multicast Group : 232.10.0.16

Source : 100.0.0.2

Act GCRs : 1

Interface : Bu255 State: A GI: Bu255 RC: 0

GCR : GC SAID SFID Key GQC GEn
 10 8859 25 0 1 0

Total session cache num: 2

```

Table 150 describes the significant fields shown in the display.

**Table 150** *show cable multicast ses-cache verbose Field Descriptions*

| Field           | Description                                         |
|-----------------|-----------------------------------------------------|
| Multicast Group | IP address of the multicast group                   |
| Source          | IP address of the source.                           |
| Act GCRs        | Active group classifier rules on the multicast QoS. |
| Interface       | Forwarding interface.                               |
| GCR             | Group classifier rules.                             |

#### Related Commands

| Command                                | Description                                                                                     |
|----------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>cable multicast ses-cache</b>       | Enables multicast replication session on the forwarding interface on the Cisco uBR10012 router. |
| <b>clear cable multicast ses-cache</b> | Clears the multicast replication session cache on the interfaces on the Cisco uBR10012 router.  |

# show cable multicast statistics failure

To display the multicast statistics failure details, use the **show cable multicast statistics** command in global configuration mode.

**show cable multicast statistics failure**

Command Default

Information for all multicast statistics failure is displayed.

Command Modes

Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

Usage Guidelines

The **show cable multicast statistics failure** command displays information about admission control failure and PXF queue failure.

Examples

The following is a sample output from the **show cable multicast statistics failure** command:

```
Router# show cable multicast statistics failure

counter value
Admission Control Failure 0
PXF Queue Failure 0
```

| Related Commands | Command                                         | Description                                                        |
|------------------|-------------------------------------------------|--------------------------------------------------------------------|
|                  | <b>show cable multicast db</b>                  | Displays the contents of the multicast explicit tracking database. |
|                  | <b>clear cable multicast statistics counter</b> | Clears all multicast statistics counters.                          |

# show cable noise

To display cable noise statistics on a Cisco CMTS, use the **show cable noise** command in EXEC mode.

**show cable** { *slot/port* | *slot/subslot/port* } **noise**

|                    |                          |                                                                                                                                                                                                                                                                                                                                          |
|--------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>slot/port</i>         | Identifies the cable interface and downstream port on the Cisco uBR7100 series and Cisco uBR7200 series routers.<br><br>On the Cisco uBR7100 series router, the only valid value is <b>1/0</b> . On the Cisco uBR7200 series router, <i>slot</i> can range from 3 to 6, and <i>port</i> can be 0 or 1, depending on the cable interface. |
|                    | <i>slot/subslot/port</i> | Identifies the cable interface on the Cisco uBR10012 router. The following are the valid values: <ul style="list-style-type: none"><li>• <i>slot</i> = 5 to 8</li><li>• <i>subslot</i> = 0 or 1</li><li>• <i>port</i> = 0 to 4 (depending on the cable interface)</li></ul>                                                              |

|               |      |
|---------------|------|
| Command Modes | EXEC |
|---------------|------|

|                 |                |                                                    |
|-----------------|----------------|----------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                |
|                 | 12.0(4)XI      | This command was introduced.                       |
|                 | 12.1(3a)EC1    | This command was removed from the 12.1 EC release. |

|                  |                                                                                   |
|------------------|-----------------------------------------------------------------------------------|
| Usage Guidelines | This command is not supported on Cisco IOS Release 12.1(3a)EC1 or later releases. |
|------------------|-----------------------------------------------------------------------------------|

**Examples** The following example shows how to display CM noise statistics:

Router# **show cable 6/0 noise**



**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

|                  |                         |                                     |
|------------------|-------------------------|-------------------------------------|
| Related Commands | <b>Command</b>          | <b>Description</b>                  |
|                  | <b>show cable modem</b> | Displays CM configuration settings. |

# show cable privacy

To display Baseline Privacy Interface Plus (BPI+) certificate information and the security or privacy information for the Cisco CMTS router, use the **show cable privacy** command in privileged EXEC mode.

```
show cable privacy {eae-exclude | hotlist {cm} | manufacturer-cert-list | root-cert-list}
```

|                    |                               |                                                                 |
|--------------------|-------------------------------|-----------------------------------------------------------------|
| Syntax Description | <b>eae-exclude</b>            | Displays the early authentication and encryption (EAE) details. |
|                    | <b>hotlist {cm}</b>           | Displays a list of cable modems detected as clones.             |
|                    | <b>manufacturer-cert-list</b> | Displays the BPI manufacturer certificate verification list.    |
|                    | <b>root-cert-list</b>         | Displays the BPI root certificate verification list.            |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

| Command History | Release     | Modification                                                                                                                |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced in a different form and its functions moved to the <b>show interface cable privacy</b> command. |
|                 | 12.2(4)BC1  | This command was introduced in its current form.                                                                            |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                             |
|                 | 12.2(33)SCC | This command was modified. The <b>eae-exclude</b> keyword was added.                                                        |
|                 | 12.2(33)SCE | This command was modified. The <b>hotlist</b> keyword was added.                                                            |

|                  |                                                                                                             |
|------------------|-------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>show cable privacy</b> command is available only in IOS images that support BPI and BPI+ encryption. |
|------------------|-------------------------------------------------------------------------------------------------------------|

**Examples** The following is a sample output of the **show cable privacy** command with the **eae-exclude** keyword that lists the cable modems excluded from the early authentication and encryption process:

```
Router# show cable privacy eae-exclude

EAE Exclusion List:
 MAC: 1111.1111.1111 Mask: ffff.ffff.ffff
 MAC: 2222.2222.2222 Mask: ffff.ffff.ffff
```

The following is a sample output of the **show cable privacy** command with the **hotlist** keyword that lists the permanent and temporary hotlist entries:

```
Router# show cable privacy hotlist cm

MAC Address Last Ranged Type Interface

0025.2eaf.6f16 Dec 13 21:03:56 Permanent C8/1/0
0025.2eaf.6f26 Dec 13 21:03:56 Temporary C5/1/0
```

Table 151 describes the significant fields shown in the **show cable privacy** command display:

**Table 151** *show cable privacy Command Field Description*

| Field          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address    | MAC address of the cable modem that is on the hotlist.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Last Ranged On | Displays the time stamp when the cable modem last attempted registration on that interface. This value helps gauge the frequency with which the MAC address is attempting to be cloned, and manage the hotlist accordingly.                                                                                                                                                                                                                                                                                                                                           |
| Type           | <ul style="list-style-type: none"> <li>Permanent—The cable modem entry can be configured as a permanent clone from the CLI by executing the <b>cable privacy hotlist cable modem</b> command. A cable modem marked as a permanent clone can only be removed from the hotlist by executing the <b>no</b> form of the <b>cable privacy hotlist cable modem</b> command.</li> <li>Temporary—The Cisco CMTS detects a duplicate cable modem MAC address. This duplicate MAC address is flagged as a clone and is prevented from coming online for 180 seconds.</li> </ul> |

#### Related Commands

| Command                              | Description                                                  |
|--------------------------------------|--------------------------------------------------------------|
| <b>cable privacy add-certificate</b> | Configures certificates for BPI+ encryption.                 |
| <b>cable privacy</b>                 | Enables and configures BPI+ encryption on a cable interface. |
| <b>show cable modem</b>              | Displays cable modem configuration settings.                 |
| <b>show interface cable privacy</b>  | Displays baseline privacy information.                       |

# show cable qos enforce-rule

To display the quality of service (QoS) enforce-rules that are currently defined, use the **show cable qos enforce-rule** command in privileged EXEC mode.

**show cable qos enforce-rule** [*name*] [**verbose**]

|                    |                |                                                                                                         |
|--------------------|----------------|---------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>name</i>    | (Optional) Specifies the name of a particular enforce-rule to be displayed.                             |
|                    | <b>verbose</b> | (Optional) Displays detailed information about the QoS enforce-rule options that are currently defined. |

**Command Default** All enforce-rules are displayed.

**Command Modes** Privileged EXEC (#)

| Command History | Release      | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC1  | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                 | 12.3(9a)BC   | This command was integrated into Cisco IOS Release 12.3(9a)BC.                                                                                                                                                                                                                                                                                                                                                                                                             |
|                 | 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                                                                                                                                                                         |
|                 | 12.3(23)BC2  | The following new output fields were added for the <b>verbose</b> form of the command: Penalty End-time, Weekend First Peak Time, Weekend First Duration, Weekend First Average-rate, Weekend Second Peak Time, Weekend Second Duration, Weekend Second Average rate, Weekend Offpeak Duration, Weekend Offpeak Average-rate, and Weekend Auto-enforce.                                                                                                                    |
|                 | 12.3(23)SCD1 | <p>The following new output fields were added for the <b>verbose</b> form of the command: Monitoring after RelTime, Penalty-Period for week-days, Penalty-Period for week-ends.</p> <p>The following output fields were modified for the <b>verbose</b> form of the command: Penalty End-time, First Peak Time, Second Peak Time, Weekend First Peak Time, Weekend Second Peak Time.</p> <p>The output field Penalty End-time was renamed as Default Penalty Duration.</p> |

**Examples** The following example shows typical output for the default version of the **show cable qos enforce-rule** command:

```
Router# show cable qos enforce-rule

 Name Dur Dir byte-cnt Auto rate penalty Reg Enf Ena Persist
 (min) (min) (kbytes) enf (min) (min) QoS QoS
residential 10 us 5 act 1 10080 5 10 Yes Yes
ef-q1ld 30 ds 150 act 1 20 11 99 Yes Yes
```

```

ef-q11u 30 us 60 act 1 20 11 99 Yes Yes
ef-q21 720 us 60 act 1 10 21 81 Yes Yes
ef-q21d 300 ds 150 act 1 10 21 81 Yes Yes
ef-q22 720 us 60 act 1 10 22 82 Yes Yes
ef-q22d 300 ds 150 act 1 10 22 82 Yes No
ef-q23 720 us 60 act 1 10 23 83 Yes Yes
ef-q23d 300 ds 150 act 1 10 23 83 Yes Yes
ef-q24 720 us 60 act 1 10 24 84 Yes Yes
ef-q24d 300 ds 150 act 1 10 24 84 Yes Yes
ef-q25 720 us 60 act 1 10 25 85 Yes Yes
ef-q25d 300 ds 150 act 1 10 25 85 Yes Yes
ef-q26 720 us 60 act 1 10 26 86 Yes Yes
ef-q26d 300 ds 150 act 1 10 26 86 Yes Yes
ef-q27 720 us 60 act 1 10 27 87 Yes Yes
ef-q27d 300 ds 150 act 1 10 27 87 Yes Yes
ef-q28 720 us 60 act 1 10 28 88 Yes Yes
ef-q28d 300 ds 150 act 1 10 28 88 Yes No
ef-q5d 300 ds 150 act 1 10 5 99 Yes Yes
ef-q5u 720 us 600 act 1 10 5 99 Yes Yes

```

The following example shows sample output from the **show cable qos enforce-rule** command for a particular enforce-rule named “residential”:

```
Router# show cable qos enforce-rule residential
```

```

 Name Dur Dir byte-cnt Auto rate penalty Reg Enf Ena Persist
 (min) (kbytes) enf (min) (min) QoS QoS
residential 10 us 5 act 1 10080 5 10 Yes Yes

```

Table 57 describes the significant fields displayed by the **show cable qos enforce-rule** command.

**Table 152** *show cable qos enforce-rule Field Descriptions*

| Field             | Description                                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name              | Name of the enforce-rule.                                                                                                                                                       |
| Dur (min)         | The monitoring duration period, in minutes.                                                                                                                                     |
| Dir               | Direction in which the byte-count is applied: <ul style="list-style-type: none"> <li>DS—Downstream direction</li> <li>US—Upstream direction</li> </ul>                          |
| byte-cnt (kbytes) | Maximum number of bytes, in kilobytes, that subscribers using this enforce-rule can transmit during the monitoring-duration window before being considered to be overconsuming. |
| Auto enf          | Displays whether the enforce-rule QoS profile is automatically activated when a subscriber exceeds their allowed bandwidth.                                                     |
| rate (min)        | Size of the sample-rate interval, in minutes.                                                                                                                                   |
| penalty (min)     | Size of the penalty period, in minutes.                                                                                                                                         |
| Reg QoS           | Profile ID for the registered QoS profile or the name of the service class.                                                                                                     |
| Enf QoS           | Profile ID for the enforced QoS profile or the name of the service class.                                                                                                       |

**Table 152** *show cable qos enforce-rule Field Descriptions (continued)*

| Field   | Description                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ena     | Displays whether this enforce-rule is currently enabled and active.                                                                                                                                                                                                                                                                                                                                         |
| Persist | Displays whether this enforce-rule keeps the enforced QoS profile in force across cable modem reboots: <ul style="list-style-type: none"> <li>• Yes—Enforced QoS profiles remain in effect across cable modem reboots.</li> <li>• No—Enforced QoS profiles do not remain in effect when a cable modem reboots. See the <b>no-persistence</b> option for the <b>qos-profile enforced</b> command.</li> </ul> |

The following example shows the sample output from the **show cable qos enforce-rule verbose** form of the command with the new output fields beginning in Cisco IOS Release 12.3(23)BC2:

```

Name : test
Version : docsis10
Monitoring Type : peak-offpeak
Registered : 255
Enforced : 4
Monitoring Duration : 120 (in minutes)
Sample-rate : 10 (in minutes)
Average-rate : 1 kbits/sec
Direction : upstream
Penalty Time : 10080 (in minutes)
Penalty End-time : 23 (time of day in hrs)
Rule Enabled : Yes
Persistence : Yes
Week-end : Yes
First Peak Time : 6
Duration : 180 (in minutes)
First Average-rate : 2 kbits/sec
Second Peak Time : 18
Duration : 240 (in minutes)
Second Average-rate : 3 kbits/sec
Offpeak Duration : 120 (in minutes)
Offpeak Average-rate : 1 kbits/sec
Auto-enforce : active
Weekend First Peak Time : 8
Weekend First Duration : 120 (in minutes)
Weekend First Average-rate : 2 kbits/sec
Weekend Second Peak Time : 18
Weekend Second Duration : 180 (in minutes)
Weekend Second Average-rate : 5 kbits/sec
Weekend Offpeak Duration : 240 (in minutes)
Weekend Offpeak Average-rate : 4 kbits/sec
Weekend Auto-enforce : active

```

The following example shows the sample output from the **show cable qos enforce-rule verbose** form of the command with the new output fields in Cisco IOS Release 12.3(33)SCD2:

Router# **show cable qos enforce-rule test verbose**

```

Name : test
Version : docsis11
Monitoring Type : peak-offpeak
Registered : REG-DS
Enforced : ENF-DS

```



```

Monitoring Duration : 70 (in minutes)
Sample-rate : 10 (in minutes)
Average-rate : 3 kbits/sec
Direction : downstream
Auto Enforce : Yes
Current Penalty Duration : 10 (in minutes)
Default Penalty Duration : 10 (in minutes)
Penalty End-time : 23:0 (time of day)
Rule Enabled : Yes
Persistence : Yes
Weekend : No
Penalty Off : No
Monitor Weekend : Yes
Monitoring after RelTime : Off

First Peak Time : 10:0
Duration : 60 (in minutes)
First Average-rate : 1 kbits/sec
Second Peak Time : 19:0
Duration : 65 (in minutes)
Second Average-rate : 2 kbits/sec
Offpeak Duration : 70 (in minutes)
Offpeak Average-rate : 3 kbits/sec
Auto Enforce : Yes
Sample Rate : 10
Penalty-Period for week-days : 0

Weekend First Peak Time : 11:0
Weekend Duration : 75 (in minutes)
Weekend First Average-rate : 4 kbits/sec
Weekend Second Peak Time : 20:0
Weekend Duration : 80 (in minutes)
Weekend Second Average-rate : 5 kbits/sec
Weekend Offpeak Duration : 85 (in minutes)
Weekend Offpeak Average-rate : 6 kbits/sec
Weekend Auto Enforce : Yes
Weekend Sample Rate : 12
Penalty-Period for week-ends : 0

```

**Related Commands**

| Command                       | Description                                                                                                                                                    |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable qos enforce-rule</b> | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode.                      |
| <b>duration</b>               | Specifies the time period and sample rate to be used for monitoring subscribers.                                                                               |
| <b>enabled (enforce-rule)</b> | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.                                                                     |
| <b>penalty-period</b>         | Specifies the time period that an enforced QoS profile should be in effect for subscribers that violate their registered QoS profiles.                         |
| <b>qos-profile enforced</b>   | Specifies a QoS profile that should be enforced when users violate their registered QoS profiles. This command is applicable for only DOCSIS 1.0 cable modems. |
| <b>qos-profile registered</b> | Specifies the registered QoS profile that should be used for this enforce-rule. This command is applicable for only DOCSIS 1.0 cable modems.                   |

| Command                                 | Description                                                                                                                                                                                |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>service-class<br/>(enforce-rule)</b> | Specifies a service class (enforced or registered) that should be used for the cable modem monitoring in an enforce-rule. This command is applicable for DOCSIS 1.1 or later cable modems. |
| <b>show cable<br/>subscriber-usage</b>  | Displays subscribers who are violating their registered QoS profiles.                                                                                                                      |

# show cable qos permission

To display the status of permissions for changing quality-of-service (QoS) tables on a Cisco CMTS, use the **show cable qos permission** command in privileged EXEC mode.

## show cable qos permission

**Syntax Description** This command has no keywords or arguments.

**Command Modes** Privileged EXEC

| Command History | Release   | Modification                                                                                                                                                                                                        |
|-----------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1 T    | This command was introduced.                                                                                                                                                                                        |
|                 | 12.1(4)CX | This command was deprecated for DOCSIS 1.1 use, because DOCSIS 1.1 replaces the QoS profile model with a service flow model. The <b>show interface cable qos paramset</b> command is used for DOCSIS 1.1 operation. |

**Examples** The following example displays the output of the **show cable qos permission** command:

```
CMTS01# show cable qos permission
```

```
Create by SNMP Update by SNMP Create by modems
yes yes yes
```

[Table 0-153](#) describes the fields displayed by the **show cable qos permission** command.

**Table 0-153 show cable qos permission Command Field Descriptions**

| Field            | Description                                                                                                      |
|------------------|------------------------------------------------------------------------------------------------------------------|
| Create by SNMP   | Indicates permission setting for creation of QoS table entries by the Simple Network Management Protocol (SNMP). |
| Update by SNMP   | Indicates permission setting for creation of QoS table entries by modem registration requests.                   |
| Create by modems | Indicates permission setting for dynamic updating of QoS table entries by the SNMP.                              |



### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

| Related Commands | Command                                      | Description                                                                                       |
|------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------|
|                  | <b>cable qos permission</b>                  | Specifies permission for updating the cable router QoS table.                                     |
|                  | <b>cable qos profile</b>                     | Configures a QoS profiles.                                                                        |
|                  | <b>cable service-flow inactivity-timeout</b> | Sets the amount of time a dynamic service-flow can be present in the system without any activity. |
|                  | <b>show controllers cable</b>                | Displays cable router QoS profiles.                                                               |
|                  | <b>show interface cable qos paramset</b>     | Displays the DOCSIS 1.1 QoS parameter sets.                                                       |

# show cable qos profile

To display quality-of-service (QoS) profiles for a Cisco CMTS, use the **show cable qos profile** command in privileged EXEC mode.

**show cable qos profile** *profile-index* [**verbose**]

## Syntax Description

|                      |                                                       |
|----------------------|-------------------------------------------------------|
| <i>profile-index</i> | Displays cable QoS table. Valid range is 1 to 255.    |
| <b>verbose</b>       | Displays detailed information about the QoS profiles. |

## Command Modes

Privileged EXEC

## Command History

| Release   | Modification                                                                                                                                                                                                        |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3NA    | This command was introduced.                                                                                                                                                                                        |
| 12.0(3)T  | The command was included in the mainline release.                                                                                                                                                                   |
| 12.0(7)XR | The <b>verbose</b> option was added.                                                                                                                                                                                |
| 12.1(1)T  | The IP precedence rate enabling bits were added to the display.                                                                                                                                                     |
| 12.1(4)CX | This command was deprecated for DOCSIS 1.1 use, because DOCSIS 1.1 replaces the QoS profile model with a service flow model. The <b>show interface cable qos paramset</b> command is used for DOCSIS 1.1 operation. |

## Examples

The following example shows how to display the existing QoS profiles on the CMTS:

```
Router# show cable qos profile
ID Prio Max Guarantee Max Max TOS TOS Create B IP prec.
 upstream upstream downstream tx mask value by priv rate
 bandwidth bandwidth bandwidth burst
1 0 0 0 0 0 0x0 0x0 cmts(r) no no
2 0 64000 0 1000000 0 0x0 0x0 cmts(r) no no
3 7 31200 31200 0 0 0x0 0x0 cmts yes no
4 7 87200 87200 0 0 0x0 0x0 cmts yes no
5 2 256000 0 128000 1503 0x0 0x0 cm no no
```

Profiles 1 and 2 are always created by the CMTS at initial startup. The CMTS dynamically creates profiles 3 and 4, as shown above, to support Voice over IP (VoIP) codecs G.711 and G.729 when a CM configures phone lines and uses dynamic service requests to request VoIP service. The remaining profiles, such as profile 5 above, are typically created by a CM when it comes online.

Profile 3 creates a grant-size of 31.22 KiloBytes per second for G.729 service, and profile 4 creates a grant-size of 87.2 KiloBytes per second for G.711 service. Both profiles use a default grant-interval of 20 milliseconds. For more information on these profiles, see the TAC technical note at the following URL:

[http://www.cisco.com/warp/public/109/uBR7200\\_QoSMAc.html](http://www.cisco.com/warp/public/109/uBR7200_QoSMAc.html)

The following example displays detailed output for profile 1:

```
Router# show cable qos profile 1 verbose
```

## ■ show cable qos profile

```

Profile Index 1
Name Default
Upstream Traffic Priority 0
Upstream Maximum Rate (bps) 0
Upstream Guaranteed Rate (bps) 0
Unsolicited Grant Size (bytes) 0
Unsolicited Grant Interval (usecs) 0
Upstream Maximum Transmit Burst (bytes) 0
IP Type of Service Overwrite Mask 0x0
IP Type of Service Overwrite Value 0x0
Downstream Maximum Rate (bps) 0
Created By cmts(r)
Baseline Privacy Enabled no

```

Table 0-154 describes the fields displayed by the **show cable qos profile** command.

**Table 0-154 show cable qos profile Command Field Descriptions**

| Field                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ID                           | Profile number.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Prio                         | Priority level.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Max upstream bandwidth       | Maximum upstream bandwidth.                                                                                                                                                                                                                                                                                                                                                                                                           |
| Guarantee upstream bandwidth | Guaranteed minimum upstream bandwidth.                                                                                                                                                                                                                                                                                                                                                                                                |
| Max downstream bandwidth     | Maximum downstream bandwidth.                                                                                                                                                                                                                                                                                                                                                                                                         |
| Max tx burst                 | Maximum transmit burst size in bytes.                                                                                                                                                                                                                                                                                                                                                                                                 |
| Tos mask                     | Hex value of the mask bits.                                                                                                                                                                                                                                                                                                                                                                                                           |
| Tos value                    | Value of the mask byte.                                                                                                                                                                                                                                                                                                                                                                                                               |
| Create by                    | Identity of who created the profile: <ul style="list-style-type: none"> <li>• cmts = Created by the CMTS with read-write properties. The profile can be modified but not deleted.</li> <li>• cmts(r) = Created by the CMTS with read-only properties. The profile cannot be modified or deleted.</li> <li>• cm = Created by the CM DOCSIS configuration file.</li> <li>• mgmt = Created by an operator using CLI commands.</li> </ul> |
| B priv enab                  | Describes whether Baseline Privacy Interface (BPI) encryption is enabled (yes) or disabled (no) for this QoS profile.                                                                                                                                                                                                                                                                                                                 |
| IP prec. rate enab           | Describes whether IP precedence rate limiting enabling is enabled (yes) or disabled (no) for this QoS profile. When a profile is created by a CM, this value is set by the Type Length Value (TLV) 11 fields in the DOCSIS configuration file, unless overwritten using the <b>cable qos profile</b> command.                                                                                                                         |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

| Related Commands | Command                                      | Description                                                                                       |
|------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------|
|                  | <b>cable qos permission</b>                  | Specifies permission for updating the cable router QoS table.                                     |
|                  | <b>cable qos profile</b>                     | Configures a QoS profiles.                                                                        |
|                  | <b>cable service-flow inactivity-timeout</b> | Sets the amount of time a dynamic service-flow can be present in the system without any activity. |
|                  | <b>show cable modem qos</b>                  | Displays quality of service (QoS) and service flow information for a particular CM.               |
|                  | <b>show cable noise</b>                      | Displays the status of permissions for changing QoS tables.                                       |
|                  | <b>show interface cable qos paramset</b>     | Displays the DOCSIS 1.1 QoS parameter sets.                                                       |

# show cable rate-adapt

To display the global and local upstream utilization optimization configuration parameters, use the **show cable rate-adapt** command in privileged EXEC mode.

**show cable rate-adapt**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                       |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(23)BC2 | This command was introduced.                                                                                       |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added. |

**Usage Guidelines** This command displays the current global rate-adapt settings that govern all cable modem and the local rate-adapt settings that relate to a specific cable modem upstream.

**Examples** The following example shows a typical display of the **show cable rate-adapt** command:

```
Router# show cable rate-adapt
Global:Enabled Local-Only:Enabled global:maps 500 priority 6, rate 12 bcs 10 fcms On
```



**Note** The output “maps 500” relates to duration. It indicates that the service flow is optimized for 500 MAPs.

Table 155 describes the fields shown in the **show cable rate-adapt** display.

**Table 155** show cable rate-adapt Field Descriptions

| Field    | Description                                                                                    |
|----------|------------------------------------------------------------------------------------------------|
| Global   | Indicates if upstream utilization optimization is enabled globally on all cable modems.        |
| Local    | Indicates if upstream utilization optimization is enabled locally on a specific upstream flow. |
| priority | Indicates the specified priority setting.                                                      |
| rate     | Indicates the specified minimum max-rate.                                                      |
| bcs      | Indicates the number of broadcast contention minislots (BCS).                                  |
| fcms     | Indicates if forced broadcast contention minislot (fcms) is turned on or off.                  |
| duration | Indicates the duration of a rate-adapt flow.                                                   |



| Related Commands | Command                                          | Description                                                                           |
|------------------|--------------------------------------------------|---------------------------------------------------------------------------------------|
|                  | <b>cable upstream<br/>rate-adapt (global)</b>    | Enables upstream utilization optimization globally on all cable modem upstream flows. |
|                  | <b>cable upstream<br/>rate-adapt (interface)</b> | Enables upstream utilization optimization locally.                                    |

# show cable rate-limit-ccf

To display information about rate limiting criteria for upstream bonded service flows on the Cisco uBR10-MC5X20H cable interface line card, use the **show cable rate-limit-ccf** command in privileged EXEC mode.

```
show cable rate-limit-ccf [start-index count | clear]
```

|                    |                    |                                                                                                           |
|--------------------|--------------------|-----------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>start-index</i> | (Optional) Starting index for the log entries. The valid range is from 0 to 2000. The default value is 0. |
|                    | <i>count</i>       | (Optional) Total number of log entries to be displayed. The valid range is from 0 to 2000.                |
|                    | <b>clear</b>       | (Optional) Clears information about rate limiting.                                                        |

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |             |                                                               |
|-----------------|-------------|---------------------------------------------------------------|
| Command History | Release     | Modification                                                  |
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

Examples

The following is a sample output of the **show cable rate-limit-ccf** command that displays information about rate limiting criteria for upstream bonded service flows on a Cisco uBR10-MC5X20H cable interface line card:

```
Router# show cable rate-limit-ccf

rate_limiting config: aggr_throughput: 215000000 aggr_burst: 240000
cpu_threshold: 50 cpu_burst: 10
5X20H rate limit: cpu-throttle 0 ccf-bw-drop 0 others 0
5X20H rate limit ccf info count: 0
```

[Table 156](#) describes the fields shown in the **show cable rate-limit-ccf** command display.

**Table 156**        *show cable rate-limit-ccf Field Descriptions*

| Field           | Description                                                                       |
|-----------------|-----------------------------------------------------------------------------------|
| aggr_throughput | Aggregate throughput value.                                                       |
| aggr_burst      | Aggregate burst rate value.                                                       |
| cpu_threshold   | CPU threshold for Continuous Concatenation and Fragmentation (CCF) in percentage. |
| cpu_burst       | CPU burst for CCF in percentage                                                   |
| cpu-throttle    | Total number of bandwidth requests that stopped due to CPU throttle.              |

**Table 156** *show cable rate-limit-ccf Field Descriptions*

| Field                           | Description                                                                     |
|---------------------------------|---------------------------------------------------------------------------------|
| ccf-bw-drop                     | Total number of bandwidth requests that stopped due to CCF resource constraint. |
| 5X20H rate limit ccf info count | Total number of log entries.                                                    |

#### Related Commands

| Command                              | Description                                                                                                             |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>cable upstream rate-limit-ccf</b> | Configures rate limiting criteria for upstream bonded service flows on a Cisco uBR10-MC5X20H cable interface line card. |

# show cable redundancy

To display the DDC redundancy partners and their relative states, and additional information about DDC states on the Cisco CMTS, use the **show cable redundancy** command in privileged EXEC mode.

**show cable redundancy {hashfilter | class | calls}**

|                    |                   |                                                                                                   |
|--------------------|-------------------|---------------------------------------------------------------------------------------------------|
| Syntax Description | <b>hashfilter</b> | Displays the hash filter(s) being used in the scheme.                                             |
|                    | <b>class</b>      | Displays the displays the number of cable modems in each DDC class of the same scheme.            |
|                    | <b>calls</b>      | Displays the number of active and E911 calls currently being supported on the relative DDC nodes. |

**Command Default** This command has no default behaviors or values.

**Command Modes** Privileged EXEC (#)

|                 |                    |                                                                              |
|-----------------|--------------------|------------------------------------------------------------------------------|
| Command History | <b>Release</b>     | <b>Modification</b>                                                          |
|                 | Release 12.3(9a)BC | This command was introduced on the Cisco uBR7246 universal broadband router. |

**Examples** The following example of the **show cable redundancy hashfilter** command illustrates the same DDC Redundancy scheme (two Cisco uBR7246VXR routers). This command displays the configured hash filter parameters. You can either list all hash filters (as shown) or list one hash filter, if specified with the optional *hash\_id* value at the end of the command.

```
Router# show cable redundancy hashfilter

HashFilter 1
HashType MacMask
default ffff.ffff.ffff
MacAddr OUI Node
0000.39cc.b270 1
0000.39cc.ba70 2
0000.39cc.c070 2

HashFilter 2
HashType MacMask
default 0000.00ff.ffff
MacAddr OUI Node
00.00.391
00.08.0D1
00.0C.E51
```

The following example of the **show cable redundancy class** command displays the number of cable modems in each DDC class of the same scheme (two Cisco uBR7246VXR routers).

```
Router# show cable redundancy class

Number of modems in each DDC class:
InterfaceClass0Class1Class2Class3Class4
```

```
Cable3/0 32 00 0 0
Cable3/1 3200 0 0
Cable4/03200 0 0
Cable4/100 0 0 0
Cable5/03100 0 0
Cable5/13200 0 0
Cable6/000 0 0 0
Cable6/100 0 0 0
```

The following example of the **show cable redundancy calls** command displays the number of active 911 (E911) calls, voice calls, and the number of cable modems with service flows for each subinterface. If the subinterface is configured on a bundle, the number of calls is the total for all the members in the bundle.

```
Router# show cable redundancy calls
```

| SubInterface | 911Calls | VoiceCalls | ModemCount | ServiceFlow |
|--------------|----------|------------|------------|-------------|
| Cable3/0.1   | 0        | 0          | 159        | 159         |
| Cable3/0.2   | 0        | 0          | 0          | 0           |

## Related Commands

| Command                                | Description                                                                                                              |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>cable redundancy hashfilter</b>     | Sets the MAC address and DDC node mappings of the DDC redundancy scheme.                                                 |
| <b>cable redundancy myid</b>           | Sets the total number of Cisco DDC nodes (routers) in the DDC Redundancy scheme and sets the ID of the current DDC node. |
| <b>cable redundancy node</b>           | Configures the DDC node with active or standby state.                                                                    |
| <b>cable redundancy node frequency</b> | Sets the downstream frequencies for each node participating in the scheme other than the current DDC node (router).      |
| <b>cable redundancy target</b>         | Sets the target DDC node (router) to use in a DDC switchover event.                                                      |
| <b>cable redundancy threshold</b>      | Sets the active voice call threshold on the current DDC node (router).                                                   |

# show cable resiliency

To display all information about the resiliency bonding groups and their assigned status on the Cisco CMTS router, use the **show cable resiliency** command in privileged EXEC mode.

**show cable resiliency**

**Command Default**      None

**Command Modes**      Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

**Examples**      The following example shows a sample output of the **show cable resiliency** command:

Router# **show cable resiliency**

| Resil BG I/F | BG ID | Resil BG State | Count | Time           | RF Ctrl | RF Num |
|--------------|-------|----------------|-------|----------------|---------|--------|
| Wi1/2/0:10   | 10    | Free           |       |                |         |        |
| Wi1/2/0:20   | 20    | Free           |       |                |         |        |
| Wi7/0/0:1    | 1     | Assigned       | 3     | Nov 3 09:55:49 | 0       | 0      |
|              |       |                |       |                |         | 1      |
|              |       |                |       |                |         | 2      |
| Wi7/0/0:2    | 2     | Assigned       | 3     | Nov 3 09:57:09 | 0       | 0      |
|              |       |                |       |                |         | 1      |
|              |       |                |       |                |         | 3      |

[Table 1](#) describes the significant fields shown in the display.

**Table 157      show cable resiliency Field Descriptions**

| Field                 | Description                                              |
|-----------------------|----------------------------------------------------------|
| <b>Resil BG I/F</b>   | Bonding group interface assigned to resiliency mode.     |
| <b>BG ID</b>          | Bonding group ID.                                        |
| <b>Resil BG State</b> | Status of the resiliency bonding group—free or assigned. |
| <b>Count</b>          | Number of times this bonding group has been assigned.    |
| <b>Time</b>           | Day and time the bonding group was last assigned.        |
| <b>RF Ctrl</b>        | Primary RF channel.                                      |
| <b>RF Num</b>         | RF index number of the assigned RF channel.              |

**Related Commands**

| Command                            | Description                                                                                |
|------------------------------------|--------------------------------------------------------------------------------------------|
| <b>cable resiliency ds-bonding</b> | Enables the Downstream Resiliency Bonding Group feature on the Cisco CMTS router.          |
| <b>cable ds-resiliency</b>         | Reserves a resiliency bonding group for a line card on the Cisco CMTS router.              |
| <b>show cable modem resiliency</b> | Displays resiliency status of the cable modem in resiliency mode on the Cisco CMTS router. |

# show cable rf-adapt

To display the downgrade and upgrade candidate modems, use the **show cable rf-adapt** command in user EXEC or privileged EXEC mode.

```
show cable rf-adapt [cable {slot/cable-interface-index | slot/subslot/cable-interface-index}
[upgrade-candidates | downgrade-candidates | upstream upstream-channel-id
[upgrade-candidates | downgrade-candidates]] | upgrade-candidates |
downgrade-candidates]
```

## Syntax Description

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b>                                  | Displays information about the cable modems in a specific cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>slot</i>                                   | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                    |
| <i>subslot</i>                                | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>cable-interface-index</i>                  | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <b>upgrade-candidates</b>                     | Displays information about the upgrade candidate cable modems.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>downgrade-candidates</b>                   | Displays information about the downgrade candidate cable modems.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>upstream</b><br><i>upstream-channel-id</i> | (Optional) Displays candidates on a particular upstream channel. The valid range for <i>upstream-channel-id</i> is from 0 to 3.                                                                                                                                                                                                                                                                                                                                                           |

## Command Modes

User EXEC (>) or  
Privileged EXEC (#)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCF | This command was introduced. |



**Examples**

The following is a sample output of the **show cable rf-adapt downgrade-candidates** command:

```
Router# show cable rf-adapt downgrade-candidates
```

| MAC Address    | IP Address | Source<br>Upstream | Destination<br>Upstream |
|----------------|------------|--------------------|-------------------------|
| 0019.474a.d4cc | 10.10.1.9  | C8/0/1/U3.0        | C8/0/1/U3.1             |
| 0019.474a.d554 | 10.10.1.73 | C8/0/14/U0.0       | C8/0/14/U0.1            |
| 0019.474a.d542 | 10.10.1.79 | C8/0/0/U0.0        | C8/0/0/U0.1             |
| 0019.474a.d508 | 10.10.1.11 | C8/0/8/U0.0        | C8/0/8/U0.1             |
| 0025.2e2d.7400 | 10.10.1.66 | C8/0/0/U1.0        | C8/0/0/U1.1             |
| 0022.cea4.f404 | 10.10.1.53 | C8/0/2/U2.0        | C8/0/2/U2.1             |

The following is a sample output of the **show cable rf-adapt upgrade-candidates** command:

```
Router# show cable rf-adapt upgrade-candidates
```

| MAC Address    | IP Address | Source<br>Upstream | Destination<br>Upstream |
|----------------|------------|--------------------|-------------------------|
| 0019.474a.d554 | 10.10.1.73 | C8/0/14/U0.1       | C8/0/14/U0.0            |
| 0019.474a.d542 | 10.10.1.79 | C8/0/0/U0.1        | C8/0/0/U0.0             |
| 0025.2e2d.7400 | 10.10.1.66 | C8/0/0/U1.1        | C8/0/0/U1.0             |

The following is a sample output of the **show cable rf-adapt cable upstream downgrade-candidates** command:

```
Router# show cable rf-adapt cable 7/0/0 upstream 0 downgrade-candidates
```

| MAC Address    | IP Address | Source<br>Upstream | Destination<br>Upstream |
|----------------|------------|--------------------|-------------------------|
| 0019.474a.d4cc | 10.10.1.9  | C7/0/0/U3.0        | C7/0/0/U3.1             |

The following is a sample output of the **show cable rf-adapt cable upstream upgrade-candidates** command:

```
Router# show cable rf-adapt cable 7/0/0 upstream 0 upgrade-candidates
```

| MAC Address    | IP Address | Source<br>Upstream | Destination<br>Upstream |
|----------------|------------|--------------------|-------------------------|
| 0019.474a.d554 | 10.10.1.73 | C7/0/0/U0.1        | C7/0/0/U0.0             |

The following is a sample output of the **show cable rf-adapt cable downgrade-candidates** command:

```
Router# show cable rf-adapt cable 7/0/0 downgrade-candidates
```

| MAC Address    | IP Address | Source<br>Upstream | Destination<br>Upstream |
|----------------|------------|--------------------|-------------------------|
| 0019.474a.d4cc | 10.10.1.9  | C7/0/0/U3.0        | C7/0/0/U3.1             |

The following is a sample output of the **show cable rf-adapt cable upgrade-candidates** command:

```
Router# show cable rf-adapt cable 7/0/0 upgrade-candidates
```

| MAC Address    | IP Address | Source<br>Upstream | Destination<br>Upstream |
|----------------|------------|--------------------|-------------------------|
| 0019.474a.d554 | 10.10.1.73 | C7/0/0/U0.1        | C7/0/0/U0.0             |

Table 158 describes the significant fields shown in the display.

**Table 158** *show cable modem rf-adapt Field Descriptions*

| Field                | Description                                                                                 |
|----------------------|---------------------------------------------------------------------------------------------|
| MAC Address          | MAC address of the cable modem.                                                             |
| IP Address           | IP address of the cable modem.                                                              |
| Source Upstream      | Source upstream port and logical channel index of the cable modem.                          |
| Destination Upstream | Destination upstream port and logical channel index to which the cable modem will be moved. |

#### Related Commands

| Command                                          | Description                                                                                                                                                               |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable rf-adapt timer</b>                      | Configures timers for RF adaptation.                                                                                                                                      |
| <b>cable upstream rf-adapt</b>                   | Enables RF adaptation on the physical upstream channel.                                                                                                                   |
| <b>cable upstream rf-adapt (logical channel)</b> | Specifies the primary upstream logical channel and the secondary upstream logical channel.                                                                                |
| <b>cable upstream threshold rf-adapt</b>         | Configures the upstream RF adaptation threshold value, which prevents excessive relocation of modems from the primary upstream channel to the secondary upstream channel. |
| <b>show cable modem</b>                          | Displays information about the registered and unregistered cable modems.                                                                                                  |
| <b>show cable modem rf-adapt</b>                 | Displays the RF adaptation history.                                                                                                                                       |

# show cable rf-status

To display the logical up and down state of a channel number, or the logical state of all RF channels, use the **show cable rf-status** command in privileged EXEC mode.

**show cable rf-status** [**modular-cable** *slot/bay/port:nb-channel-number*]

| Syntax Description | modular-cable     | (Optional) Specifies the modular cable interface.                                                          |
|--------------------|-------------------|------------------------------------------------------------------------------------------------------------|
|                    | slot              | (Optional) The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
|                    | bay               | (Optional) The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
|                    | port              | (Optional) Specifies the interface number on the SPA.                                                      |
|                    | nb-channel-number | (Optional) Specifies the channel number for the RF channel.                                                |

|                 |                                |
|-----------------|--------------------------------|
| Command Default | No default behavior or values. |
|-----------------|--------------------------------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Examples** The following is a sample output of the **show cable rf-status** command used to display the logical state of all RF channels on a modular cable interface:

```
Router# show cable rf-status
```

| RF      | Logical Status | Flap Counts | Flap Time |
|---------|----------------|-------------|-----------|
| -----   | -----          | -----       | ----      |
| 1/0/0 0 | UP             | 0           |           |
| 1       | UP             | 0           |           |
| 2       | UP             | 0           |           |
| 3       | UP             | 0           |           |
| 5       | UP             | 0           |           |
| 6       | UP             | 0           |           |
| 7       | UP             | 0           |           |
| 8       | UP             | 0           |           |
| 9       | UP             | 0           |           |
| 10      | UP             | 0           |           |
| 11      | UP             | 0           |           |
| 12      | UP             | 0           |           |
| 13      | UP             | 0           |           |
| 14      | UP             | 0           |           |
| 15      | UP             | 0           |           |
| 16      | UP             | 0           |           |
| 17      | UP             | 0           |           |

**show cable rf-status**

```

18 UP 0
19 UP 0
20 UP 0
21 UP 0
22 UP 0
23 UP 0

```

Table 159 describes the significant fields shown in the display.

**Table 159** *show cable rf-status Field Descriptions*

| Field          | Description                                                             |
|----------------|-------------------------------------------------------------------------|
| RF             | Indicates the RF channel ID.                                            |
| Logical Status | Indicates the logical up and down state of all RF channels.             |
| Flap Counts    | Indicates the number of times the RF channel has dropped and recovered. |
| Flap Time      | Indicates the duration in seconds for each flap count.                  |

The following is a sample output of the **show cable rf-status** command used to display the logical up and down state of a particular channel number on a modular cable interface:

```

Router# show cable rf-status modular-cable 1/0/0:1

Load for five secs: 6%/0%; one minute: 3%; five minutes: 2%
Time source is NTP, .14:47:27.751 EDT Thu Aug 7 2008

 Logical Flap Flap
RF Status Counts Time

1/0/0 1 UP 0

```

## Related Commands

| Command                         | Description                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>show interface rf-status</b> | Displays the logical up and down state for each of the configured RF channels for a wideband interface. |

# show cable rsvp flow-db

To display contents of the Resource ReSerVation Protocol (RSVP) to DOCSIS service-flow mapping database, use the **show cable rsvp flow-db** command in user EXEC mode.

**show cable rsvp flow-db** [*mac-addr*]

| Syntax          | Description                                                                   |
|-----------------|-------------------------------------------------------------------------------|
| <i>mac-addr</i> | (Optional) The MAC address of the specific cable modem in hexadecimal format. |

| Command Default | No default behavior or values. |
|-----------------|--------------------------------|
|-----------------|--------------------------------|

| Command Modes | User EXEC mode |
|---------------|----------------|
|---------------|----------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

| Usage Guidelines | The <b>show cable rsvp flow-db</b> command displays contents of the RSVP to DOCSIS service-flow mapping database. |
|------------------|-------------------------------------------------------------------------------------------------------------------|
|------------------|-------------------------------------------------------------------------------------------------------------------|

| Examples | The following example shows the sample output for the <b>show cable rsvp flow-db</b> command. |
|----------|-----------------------------------------------------------------------------------------------|
|----------|-----------------------------------------------------------------------------------------------|

```
Router# show cable rsvp flow-db
CM Count : 1
Flow Count : 1
Mac Address Src IP Src Dest IP Dest Pr Sfid Dir Handle
 Port Port Port Port ot (Hex)
0019.474a.c5f6 200.0.0.1 1000 40.1.1.62 1000 6 11 DS 7000406
```

[Table 160](#) describes the significant fields shown in the display.

**Table 160 cable rsvp flow-db Field Descriptions**

| Field       | Description                                                |
|-------------|------------------------------------------------------------|
| Mac Address | The MAC address of the specific cable modem.               |
| Src IP      | RSVP path source IP address.                               |
| Src Port    | RSVP path source port number.                              |
| Dest IP     | Destination IP address.                                    |
| Dest port   | Destination port number.                                   |
| Proto       | IP protocol type. Here 17 is the UDP's IP protocol number. |

**Table 160** cable rsvp flow-db Field Descriptions

| Field | Description                                                              |
|-------|--------------------------------------------------------------------------|
| SFid  | Service flow ID.                                                         |
| Dir   | Direction of the DOCSIS service flow. Here DS indicates downstream flow. |

**Related Commands**

| Command                      | Description                                       |
|------------------------------|---------------------------------------------------|
| <b>cable rsvp default-sc</b> | Specifies the default service class for the RSVP. |

# show cable service-class

To display the parameters for cable service class, use the **show cable service class** command in privileged EXEC mode.

**show cable service-class** [*sclass-index*] [**verbose**]

## Syntax Description

|                     |                                                                                    |
|---------------------|------------------------------------------------------------------------------------|
| <i>sclass-index</i> | Identifies the index for a service class that has already been defined (1 to 255). |
| <b>verbose</b>      | Displays all of the defined attributes for the service class.                      |

## Command Modes

Privileged EXEC

## Command History

| Release     | Modification                                                                                                                                                        |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX   | This command was introduced.                                                                                                                                        |
| 12.2(4)BC1  | Support was added to the Release 12.2 BC train.                                                                                                                     |
| 12.2(33)SCC | This command was integrated into Cisco IOS Release 12.2(33)SCC. The command output was modified to display the traffic peak rate value for a specific service flow. |
| 12.2(33)SCG | The command output was modified to display the scheduling type as “N/A” for all downstream service flows.                                                           |

## Usage Guidelines

You can display a summary of either one service class or all service classes. You can also display a complete listing of each service class and of all the defined service classes.



### Note

Starting with Cisco IOS Release 12.2(33)SCG, the output of the **show cable service class** command displays the scheduling type of all downstream service flows (DS-SF) as “N/A” to indicate that the DS-SFs do not have any scheduling type.

## Examples

The following sample output shows the standard and verbose formats of the **show cable service class** command:

Router# **show cable service-class**

```

Index Name Dir Sched Prio MaxSusRate MaxBurst MinRsvRate
 1 UP_UGS US/DS UGS 0 0 1522 0
 2 UP_UGSAD US/DS UGS_AD 0 0 1522 0
 3 UP_RTPS US/DS RTPS 0 128000 2000 64000
 4 UP_BE US/DS BE 5 128000 2000 0
 5 DOWN_BE US/DS BE 5 1000000 3000 0

```

Router# **show cable service-class 1**

```

Index Name Dir Sched Prio MaxSusRate MaxBurst MinRsvRate
 1 UP_UGS US/DS UGS 0 0 1522 0

```

## ■ show cable service-class

Router# **show cable service-class 1 verbose**

```

Index: 1
Name: UP_UGS
Direction: Upstream/Downstream
Traffic Priority: 0
Maximum Sustained Rate: 0 bits/sec
Max Burst: 1522 bytes
Minimum Reserved Rate: 0 bits/sec
Minimum Packet Size 100 bytes
Admitted QoS Timeout 30 seconds
Active QoS Timeout 30 seconds
Scheduling Type: Unsolicited Grant Service
Request/Transmission Policy: 0x1FF
Unsolicited Grant Size: 100 bytes
Nominal Grant Interval: 20000 usecs
Tolerated Grant Jitter: 4000 usecs
Grants per Interval: 1
IP ToS Overwrite [AND-mask,OR-mask]: 0xE0,0xA0
Max Latency: 0 usecs
Parameter Presence Bitfield: {0xE08, 0xBCC000}

```

Router# **show cable service-class verbose**

```

Index: 1
Name: UP_UGS
Direction: Upstream/Downstream
Traffic Priority: 0
Maximum Sustained Rate: 0 bits/sec
Max Burst: 1522 bytes
Minimum Reserved Rate: 0 bits/sec
Minimum Packet Size 100 bytes
Peak Rate 0 bits/sec
Admitted QoS Timeout 30 seconds
Active QoS Timeout 30 seconds
Scheduling Type: Unsolicited Grant Service
Request/Transmission Policy: 0x1FF
Unsolicited Grant Size: 100 bytes
Nominal Grant Interval: 20000 usecs
Tolerated Grant Jitter: 4000 usecs
Grants per Interval: 1
IP ToS Overwrite [AND-mask,OR-mask]: 0xE0,0xA0
Max Latency: 0 usecs
Parameter Presence Bitfield: {0xE08, 0xBCC000}
Index: 2
Name: UP_UGSAD
Direction: Upstream/Downstream
Traffic Priority: 0
Maximum Sustained Rate: 0 bits/sec
Max Burst: 1522 bytes
Minimum Reserved Rate: 0 bits/sec
Minimum Packet Size 100 bytes
Peak Rate 0 bits/sec
Admitted QoS Timeout 30 seconds
Active QoS Timeout 30 seconds
Scheduling Type: Unsolicited Grant Service(AD)
Request/Transmission Policy: 0x1FF
Nominal Polling Interval: 10000 usecs
Tolerated Poll Jitter: 4000 usecs
Unsolicited Grant Size: 100 bytes
Nominal Grant Interval: 20000 usecs
Tolerated Grant Jitter: 4000 usecs
Grants per Interval: 1

```



```

IP ToS Overwrite [AND-mask,OR-mask]: 0xE0,0xA0
Max Latency: 0 usecs
Parameter Presence Bitfield: {0xE08, 0xBFC000}

Index: 3
Name: UP_RTPS
Direction: Upstream/Downstream
Traffic Priority: 0
Maximum Sustained Rate: 128000 bits/sec
Max Burst: 2000 bytes
Minimum Reserved Rate: 64000 bits/sec
Minimum Packet Size: 64 bytes
Peak Rate: 0 bits/sec
Admitted QoS Timeout: 30 seconds
Active QoS Timeout: 30 seconds
Maximum Concatenated Burst: 1522 bytes
Scheduling Type: Realtime Polling Service
Request/Transmission Policy: 0x1FF
Nominal Polling Interval: 10000 usecs
Tolerated Poll Jitter: 4000 usecs
IP ToS Overwrite [AND-mask,OR-mask]: 0xE0,0xA0
Max Latency: 0 usecs
Parameter Presence Bitfield: {0xDC8, 0x83E000}

Index: 4
Name: UP_BE
Direction: Upstream/Downstream
Traffic Priority: 5
Maximum Sustained Rate: 128000 bits/sec
Max Burst: 2000 bytes
Minimum Reserved Rate: 0 bits/sec
Minimum Packet Size: 64 bytes
Peak Rate: 0 bits/sec
Admitted QoS Timeout: 30 seconds
Active QoS Timeout: 30 seconds
Maximum Concatenated Burst: 1522 bytes
Scheduling Type: Best Effort
Request/Transmission Policy: 0x0
IP ToS Overwrite [AND-mask,OR-mask]: 0xE0,0x0
Max Latency: 0 usecs
Parameter Presence Bitfield: {0xDE8, 0x80E000}

Index: 5
Name: DOWN_BE
Direction: Upstream/Downstream
Traffic Priority: 5
Maximum Sustained Rate: 1000000 bits/sec
Max Burst: 3000 bytes
Minimum Reserved Rate: 0 bits/sec
Minimum Packet Size: 64 bytes
Peak Rate: 0 bits/sec
Admitted QoS Timeout: 30 seconds
Active QoS Timeout: 30 seconds
Maximum Concatenated Burst: 0 bytes
Scheduling Type: Best Effort
Request/Transmission Policy: 0x0
IP ToS Overwrite [AND-mask,OR-mask]: 0xFF,0x0
Max Latency: 0 usecs
Parameter Presence Bitfield: {0xDE8, 0x0}

```

Router#

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

|                                          |                                                           |
|------------------------------------------|-----------------------------------------------------------|
| <b>cable service class</b>               | Defines and modifies a service class.                     |
| <b>show interface cable qos paramset</b> | Displays the parameters in one or more service templates. |

# show cable service-voice downstream-type

To display the downstream-types that are capable of providing voice services, use the **show cable service-voice downstream-type** command.

**show cable service-voice downstream-type**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no keywords or arguments. |
|---------------------------|--------------------------------------------|

|                        |                               |
|------------------------|-------------------------------|
| <b>Command Default</b> | No default behavior or values |
|------------------------|-------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

|                        |                |                                                            |
|------------------------|----------------|------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                        |
|                        | 12.3(23)BC     | This command was introduced for the Cisco uBR10012 router. |

|                         |                                                                                                                                 |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Use this command to display the downstream-types that are capable for providing voice services on each uBR10-MC 5x20 line card. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The example below shows that both HA-capable-DS and MDC-DS are enabled for downstream types on the uBR10-MC 5x20 line card in slot 5, subslot 1 and the line card in slot 6, subslot 0. |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show cable service-voice downstream-type
Slot 5/1 : HA-capable-DS MDC-DS
Slot 6/0 : HA-capable-DS MDC-DS
```

# show cable signal-quality

To display information about the signal quality of an upstream port on a cable interface, use the **show cable signal-quality** command in privileged EXEC mode.

```
show cable signal-quality {cable {slot/port | slot/subslot/port} upstream number | cmts | mer }
```

|                    |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>cable</b>             | Specifies the cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                    | <i>slot/subslot/port</i> | Displays information about all CMs on the specified cable interface line card on a Cisco CMTS router: <ul style="list-style-type: none"> <li><i>slot</i>—Chassis slot number of the cable interface line card. Valid slots are from 5 to 8.</li> <li><i>subslot</i>—Secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Port number. Valid ports are from 0 to 4, depending on the cable interface line card.</li> </ul> |
|                    | <b>upstream number</b>   | Specifies the upstream channel ID. Valid values are from 0 to 3.                                                                                                                                                                                                                                                                                                                                                                                                             |
|                    | <b>cmts</b>              | Displays the carrier-to-noise ratio (CNR) data and expected signal power received per cable interface.                                                                                                                                                                                                                                                                                                                                                                       |
|                    | <b>mer</b>               | Displays the modulation error rate (MER) data per cable interface.                                                                                                                                                                                                                                                                                                                                                                                                           |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                                                               |
|-----------------|----------------|---------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                           |
|                 | 12.2(33)SCC    | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Usage Guidelines**

The **show cable signal-quality** command with the **mer** keyword displays the modulation error rate data per cable interface. Note that at least one cable modem (CM) must be online on the cable interface for this command to provide the modulation error rate data. This is identical to the modulation error rate data displayed by the **show controllers** command.

The CNR data is displayed only for the upstream channels that are assigned to a spectrum group. Upstream channels with fixed frequencies do not return any CNR data.

**Examples**

The following example shows the CNR data received on the upstream ports on the cable interface line card at slot/subslot/port 7/0/3 on a Cisco uBR10012 router:

```
Router# show cable signal-quality cable 7/0/3 cmts
```

|               |           |                                       |
|---------------|-----------|---------------------------------------|
| I/F           | CNiR (dB) | Expected Received Signal Power (dBmV) |
| Cable7/0/3/U0 | 55.0      | 1.0                                   |
| Cable7/0/3/U1 | 44.0      | 0.0                                   |
| Cable7/0/3/U2 | 43.0      | -1.0                                  |
| Cable7/0/3/U3 | 43.0      | 2.0                                   |

The following example shows the MER data received on the cable upstream port 3 on the cable interface line card at slot/subslot/port 5/0/0 on a Cisco uBR10012 router:

```
Router# show cable signal-quality cable 5/0/0 upstream 3 mer
```

| I/F           | Received MER<br>(dB) | Received MER<br>Samples |
|---------------|----------------------|-------------------------|
| Cable5/0/0/U3 | 36.0                 | 10                      |

The following example shows the signal quality information for all cable interfaces on a Cisco uBR10012 router:

```
Router#show cable signal-quality mer
```

| I/F           | Received MER<br>(dB) | Received MER<br>Samples |
|---------------|----------------------|-------------------------|
| Cable6/1/0/U0 | ----                 | ----                    |
| Cable6/1/0/U1 | ----                 | ----                    |
| Cable6/1/0/U2 | ----                 | ----                    |
| Cable6/1/0/U3 | ----                 | ----                    |
| Cable6/1/1/U0 | ----                 | ----                    |
| Cable6/1/1/U1 | ----                 | ----                    |
| Cable6/1/1/U2 | ----                 | ----                    |
| Cable6/1/1/U3 | ----                 | ----                    |
| Cable6/1/2/U0 | ----                 | ----                    |
| Cable6/1/2/U1 | ----                 | ----                    |
| Cable6/1/2/U2 | ----                 | ----                    |
| Cable6/1/2/U3 | ----                 | ----                    |
| Cable6/1/3/U0 | ----                 | ----                    |
| Cable6/1/3/U1 | ----                 | ----                    |
| Cable6/1/3/U2 | ----                 | ----                    |
| Cable6/1/3/U3 | ----                 | ----                    |
| Cable6/1/4/U0 | ----                 | ----                    |
| Cable6/1/4/U1 | ----                 | ----                    |
| Cable6/1/4/U2 | ----                 | ----                    |
| Cable6/1/4/U3 | ----                 | ----                    |
| Cable7/1/0/U0 | 23.6                 | 10                      |
| Cable7/1/0/U1 | ----                 | ----                    |
| Cable7/1/0/U2 | ----                 | ----                    |
| Cable7/1/0/U3 | ----                 | ----                    |
| Cable7/1/1/U0 | ----                 | ----                    |
| Cable7/1/1/U1 | ----                 | ----                    |
| Cable7/1/1/U2 | ----                 | ----                    |
| Cable7/1/1/U3 | ----                 | ----                    |
| Cable7/1/2/U0 | ----                 | ----                    |
| Cable7/1/2/U1 | ----                 | ----                    |
| Cable7/1/2/U2 | ----                 | ----                    |
| Cable7/1/2/U3 | ----                 | ----                    |
| Cable7/1/3/U0 | ----                 | ----                    |
| Cable7/1/3/U1 | ----                 | ----                    |
| Cable7/1/3/U2 | ----                 | ----                    |
| Cable7/1/3/U3 | ----                 | ----                    |
| Cable7/1/4/U0 | ----                 | ----                    |
| Cable7/1/4/U1 | ----                 | ----                    |
| Cable7/1/4/U2 | ----                 | ----                    |
| Cable7/1/4/U3 | ----                 | ----                    |
| Cable8/0/0/U0 | 36.1                 | 10                      |
| Cable8/0/0/U1 | ----                 | ----                    |

Table 161 describes the major fields displayed by the **show cable signal-quality** command.

**Table 161** *show cable signal-quality Command Field Descriptions*

| Field                                 | Description                                             |
|---------------------------------------|---------------------------------------------------------|
| I/F                                   | Cable interface.                                        |
| CNiR (db)                             | CNR value.                                              |
| Expected Received Signal Power (dBmV) | Expected signal power received per upstream port.       |
| Received MER (db)                     | Received MER signal-to-noise ratio (SNR) value.         |
| Received MER (samples)                | Samples used for calculating the SNR per upstream port. |

#### Related Commands

| Command                             | Description                                                                                                               |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>show cable spectrum-analysis</b> | Displays information about the spectrum measurements of an upstream port on a cable interface on a Cisco uBR10012 router. |
| <b>show controllers</b>             | Displays information about the interface controllers for a cable interface on the Cisco CMTS router.                      |
| <b>show cable modem cnr</b>         | Displays information about CNR or SNR data for a particular cable modem.                                                  |
| <b>show cable modem</b>             | Displays information about the registered and unregistered CMs on a Cisco CMTS router.                                    |

# show cable spectrum-analysis

To display information about the spectrum measurements of an upstream port on a cable interface line card, use the **show cable spectrum-analysis** command in privileged EXEC mode.

**show cable spectrum-analysis** *slot/subslot/port* **upstream** *port*

|                           |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>slot/subslot/port</i>    | Displays information about all CMs on the specified cable interface line card on a Cisco CMTS router: <ul style="list-style-type: none"> <li><i>slot</i>—Chassis slot number of the cable interface line card. Valid slots are from 5 to 8.</li> <li><i>subslot</i>—Secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Downstream port number. Valid ports are from 0 to 4, depending on the cable interface line card.</li> </ul> |
|                           | <b>upstream</b> <i>port</i> | Specifies the upstream port number.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

|                      |                    |
|----------------------|--------------------|
| <b>Command Modes</b> | Privileged EXEC(#) |
|----------------------|--------------------|

|                        |                |                                                               |
|------------------------|----------------|---------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                           |
|                        | 12.2(33)SCC    | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Examples** The following example shows the spectrum measurements on upstream port 1 on a Cisco uBR10012 router:

```
Router# show cable spectrum-analysis c5/0/0 upstream 1

Spectrum Analysis Measurements for Cable5/0/0: Upstream 1
Channel Center Frequency: 17000000 Hz
Frequency Span: 6400000 Hz
Number of Bins: 321
Bin Spacing: 20000 Hz
Resolution Bandwidth: 34200 Hz
Amplitude Data:
 Bin 1: -60.00 dBmV
 Bin 2: -58.00 dBmV
 Bin 3: -58.00 dBmV
 Bin 4: -58.00 dBmV
 Bin 5: -55.00 dBmV
 Bin 6: -55.00 dBmV
 Bin 7: -58.00 dBmV
 Bin 8: -55.00 dBmV
 Bin 9: -49.00 dBmV
 Bin 10: -49.00 dBmV
 Bin 11: -49.00 dBmV
 Bin 12: -49.00 dBmV
 Bin 13: -49.00 dBmV
 Bin 14: -55.00 dBmV
 Bin 15: -58.00 dBmV
```

## show cable spectrum-analysis

```

Bin 16: -45.00 dBmV
Bin 17: -38.00 dBmV
Bin 18: -35.00 dBmV
Bin 19: -33.00 dBmV
Bin 20: -33.00 dBmV
Bin 21: -34.00 dBmV
Bin 22: -37.00 dBmV
Bin 23: -37.00 dBmV
Bin 24: -32.00 dBmV
Bin 25: -28.00 dBmV
Bin 26: -27.00 dBmV
Bin 27: -26.00 dBmV
Bin 28: -27.00 dBmV
Bin 29: -31.00 dBmV
Bin 30: -32.00 dBmV
Bin 31: -29.00 dBmV
Bin 32: -29.00 dBmV

```

Table 161 describes the significant fields shown in the display.

**Table 162** *show cable spectrum-analysis Field Descriptions*

| Field                          | Description                                                 |
|--------------------------------|-------------------------------------------------------------|
| Spectrum analysis measurements | Spectrum measurements.                                      |
| Channel center frequency       | Channel center frequency value.                             |
| Frequency span                 | Frequency span.                                             |
| No of Bins                     | Total number of bins in the spectrum analysis data.         |
| Bin spacing                    | Spacing between the center frequency of each bin.           |
| Resolution Bandwidth           | Spacing between bins after the spectral window is applied.  |
| Amplitude Data                 | Spectral amplitudes for the received signal power of a bin. |

## Related Commands

| Command                          | Description                                                                                                                       |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>show cable signal-quality</b> | Displays information about the signal quality of an upstream port on a cable interface line card.                                 |
| <b>show controllers cable</b>    | Displays information about the interface controllers for a cable interface line card on a Cisco CMTS router.                      |
| <b>show cable modem cnr</b>      | Displays information about the upstream carrier-to-noise ratio (CNR) or signal-to-noise ratio (SNR) for a particular cable modem. |



# show cable spectrum-group

To display information about spectrum groups on a Cisco CMTS, use the **show cable spectrum-group** command in user EXEC or privileged EXEC mode.

**show cable spectrum-group** [*groupnum*] [**detail**]

|                           |                 |                                                                                                                                                             |
|---------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>groupnum</i> | (Optional) Displays information about the specified group number (1–32). If no group number is specified, information for all spectrum groups is displayed. |
|                           | <b>detail</b>   | (Optional) Displays whether the groups are allocated, free, or in-use.                                                                                      |

|                      |                            |
|----------------------|----------------------------|
| <b>Command Modes</b> | User EXEC, Privileged EXEC |
|----------------------|----------------------------|

|                        |                     |                                      |
|------------------------|---------------------|--------------------------------------|
| <b>Command History</b> | <b>Release</b>      | <b>Modification</b>                  |
|                        | 11.3 NA             | This command was introduced.         |
|                        | 12.0(5)SC, 12.0(5)T | The <b>detail</b> keyword was added. |

## Examples

The following is sample output from the **show cable spectrum-group** command for all upstream spectrum groups:

CMTS01# **show cable spectrum-group**

| Group No. | Frequency Band (Mhz) | Upstream Port | Weekly Scheduled Availability From Time: | To Time: | Power Level (dBmV) | Shared Spectrum |
|-----------|----------------------|---------------|------------------------------------------|----------|--------------------|-----------------|
| 1         | 5.000–42.000         |               |                                          |          | 0                  | No              |
| 1         | 17.328 [1.60]        | Cable3/0 U0   |                                          |          | 0                  |                 |
| 1         | 5.808 [1.60]         | Cable3/0 U1   |                                          |          | 0                  |                 |
| 1         | 5.808 [1.60]         | Cable3/0 U2   |                                          |          | 0                  |                 |
| 1         | 15.792 [1.60]        | Cable3/0 U3   |                                          |          | 0                  |                 |
| 1         | 6.096 [1.60]         | Cable3/0 U4   |                                          |          | 0                  |                 |
| 1         | 5.808 [1.60]         | Cable3/0 U5   |                                          |          | 0                  |                 |
| 2         | 5.000–42.000         |               |                                          |          | 0                  | No              |
| 2         | 6.608 [3.20]         | Cable6/0 U1   |                                          |          | 0                  |                 |
| 2         | 5.808 [1.60]         | Cable6/0 U2   |                                          |          | 0                  |                 |
| 2         | 5.808 [1.60]         | Cable6/0 U3   |                                          |          | 0                  |                 |
| 2         | 5.808 [1.60]         | Cable6/0 U4   |                                          |          | 0                  |                 |
| 2         | 5.808 [1.60]         | Cable6/0 U5   |                                          |          | 0                  |                 |
| 3         | 5.000–42.000         |               |                                          |          | 0                  | No              |
| 3         | 17.488 [1.60]        | Cable5/0 U1   |                                          |          | 0                  |                 |
| 3         | 6.160 [1.60]         | Cable5/0 U2   |                                          |          | 0                  |                 |
| 3         | 36.912 [1.60]        | Cable5/0 U3   |                                          |          | 0                  |                 |
| 3         | 36.560 [1.60]        | Cable5/0 U4   |                                          |          | 0                  |                 |
| 3         | 16.240 [1.60]        | Cable5/0 U5   |                                          |          | 0                  |                 |
| 4         | 6.000– 8.600         |               |                                          |          | 0                  | No              |
| 4         | 16.000–18.000        |               |                                          |          | 0                  | No              |
| 4         | 17.168 [1.60]        | Cable5/0 U0   |                                          |          | 0                  |                 |
| 5         | 5.000–42.000         |               |                                          |          | 0                  | No              |
| 6         | 5.000–42.000         |               |                                          |          | 0                  | No              |

**show cable spectrum-group**

```

7 5.000-42.000 0 No
8 5.000-42.000 0 No
9 5.000-42.000 0 No
10 5.000-42.000 0 No
11 5.000-42.000 0 No
12 10.000-13.000 0 No
CMTS#

```

The following is sample output from the **show cable spectrum-group detail** command:

CMTS# **show cable spectrum-group detail**

| Group No. | Frequency Band (Mhz) | Upstream Port | Weekly Scheduled Availability From Time: To Time: | Power Level (dBmV) | Shared Spectrum |
|-----------|----------------------|---------------|---------------------------------------------------|--------------------|-----------------|
| 1         | 10.000               |               |                                                   | 1                  | Yes             |
| 1         | 10.000               |               |                                                   | 2                  | Yes             |
| 1         | 11.000               |               |                                                   | 3                  | Yes             |
| 1         | 11.000               |               |                                                   | 4                  | Yes             |
| 1         | 15.000-20.000        |               |                                                   | 0                  | Yes             |
| A         | 8.400-12.600         |               |                                                   |                    |                 |
| A         | 15.000-20.000        |               |                                                   |                    |                 |
| 1         | 11.008 [0.80]        | Cable3/0 U2   |                                                   | 4                  |                 |
| 1         | 15.808 [1.60]        | Cable3/0 U3   |                                                   | 0                  |                 |
| 1         | Unassigned           | Cable3/0 U4   |                                                   |                    |                 |
| 1         | 17.408 [1.60]        | Cable3/0 U5   |                                                   | 0                  |                 |
| I         | 10.600-11.400        |               |                                                   | 4                  |                 |
| I         | 15.000-16.600        |               |                                                   | 0                  |                 |
| I         | 16.600-18.200        |               |                                                   | 0                  |                 |
| F         | 8.400-10.600         |               |                                                   |                    |                 |
| F         | 11.400-12.600        |               |                                                   |                    |                 |
| F         | 18.200-20.000        |               |                                                   |                    |                 |
| C         | Width [3.20]         |               |                                                   |                    |                 |
| C         | Width [1.60]         |               |                                                   |                    |                 |
| C         | Width [0.80]         |               |                                                   |                    |                 |
| O         | 19.000 [1.60]        |               |                                                   | 0                  |                 |
| O         | 10.000 [0.80]        |               |                                                   | 2                  |                 |
| O         | 18.600 [0.80]        |               |                                                   | 0                  |                 |
| O         | 19.400 [0.80]        |               |                                                   | 0                  |                 |
| O         | 10.000 [0.80]        |               |                                                   | 1                  |                 |

CMTS#

[Table 0-163](#) describes the fields shown in the **show cable spectrum-group** displays.

**Table 0-163 show cable spectrum-group Command Field Descriptions**

| Field                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Group No.                     | Identifies the spectrum group. When using the detail keyword, the following also appear: <ul style="list-style-type: none"> <li>• A = Signifies that the band is allocated.</li> <li>• F = Signifies that the band is free.</li> <li>• I = Signifies that the band is in-use.</li> <li>• C = Identifies the channel width.</li> <li>• O = Identifies the offered list bands (based on the current channel widths).</li> </ul> |
| Frequency Band (MHz)          | Identifies the upper and lower ranges of the frequency for this spectrum group.                                                                                                                                                                                                                                                                                                                                               |
| Upstream Port                 | Identifies the upstream port number.                                                                                                                                                                                                                                                                                                                                                                                          |
| Weekly Scheduled Availability | Identifies the day and time of day when this group is available. If no values appear in the <b>From</b> and <b>To Time</b> fields, this group is available at all times.                                                                                                                                                                                                                                                      |
| Input PowerLevel              | Identifies the assigned decibels per millivolt (dBmV) input level.                                                                                                                                                                                                                                                                                                                                                            |
| Shared Spectrum               | Indicates if upstreams are physically combined (share the same combiner group). Y or yes values indicate that upstreams that are members of the spectrum group are combined and cannot be assigned overlapping frequency bands.<br><br>N or no values indicate that upstreams that are members of the spectrum group are not combined and can be assigned overlapping frequency bands.                                        |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                              | Description                                    |
|--------------------------------------|------------------------------------------------|
| <b>show cable hop</b>                | Displays CM configuration settings.            |
| <b>show cable modulation-profile</b> | Displays modulation profile group information. |

# show cable subscriber-usage

To display subscribers who are violating their registered quality of service (QoS) profiles, use the **show cable subscriber-usage** command in privileged EXEC mode.

```
show cable subscriber-usage [over-consume] [{cable slot/port | cable
slot/subslot/port}][upstream port]] [sort-byte-count] [sort-avg-rate]
```

## Syntax Description

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>over-consume</b>            | (Optional) Displays only those subscribers who have exceeded their maximum allowed bandwidth.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>cable slot/port</b>         | (Optional) Displays information for all CMs on the specified cable interface and downstream port on a Cisco 7100 series or Cisco 7200 series router, where: <ul style="list-style-type: none"> <li>slot—Specifies the chassis slot number of the cable interface line card.</li> <li>port—Specifies the downstream port number.</li> </ul> Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering. |
| <b>cable slot/subslot/port</b> | (Optional) Displays information for all CMs on the specified cable interface on a Cisco uBR10012 router, where: <ul style="list-style-type: none"> <li>slot—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li>subslot—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li>port—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul>                                                                  |
| <b>upstream port</b>           | (Optional) Displays information for a particular upstream on the selected cable interface. The <i>port</i> value starts with 0 and continues up, depending on the type of cable interface card.                                                                                                                                                                                                                                                                                                                                                                               |
| <b>sort-byte-count</b>         | (Optional) Sorts the list by the subscriber byte count, with the highest byte counts listed first. The default is to sort the list by Service Flow ID (SFID). (This option is replaced by the <b>sort-avg-rate</b> keyword in later releases.)                                                                                                                                                                                                                                                                                                                                |
| <b>sort-avg-rate</b>           | (Optional) Sorts the list by the subscriber's average rate. The default is to sort the list by Service Flow ID (SFID).                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Command Default

All subscribers are shown, with the display sorted by SFID.

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced.                                                                                                                                     |
| 12.3(9a)BC  | This command was integrated into Cisco IOS Release 12.3(9a)BC. The <b>sort-byte-count</b> keyword option is replaced by the <b>sort-avg-rate</b> keyword option. |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                               |

## Usage Guidelines

The **show cable subscriber-usage** command displays the current usage statistics for all subscribers on the Cisco CMTS router, all subscribers on a particular cable interface, or for only those subscribers that are marked as over-consuming bandwidth.

Effective with Cisco IOS Release 12.3(9a)BC, the **sort-byte-count** keyword option is replaced by the **sort-avg-rate** keyword option.

## Examples

The following example shows typical output for the default version of the **show cable subscriber-usage** command:

Router# **show cable subscriber-usage**

| Sfid | Mac            | Address    | Enforce-rule<br>Name | Total-Kbyte<br>Count | Last-detect<br>time | Last-penalty<br>time | Pen<br>Flag |
|------|----------------|------------|----------------------|----------------------|---------------------|----------------------|-------------|
| 3    | 0007.0e03.110d | efrule-q5  | 121944817            | Jan1                 | 03:44:08            | Jan1 03:54:08        | Act         |
| 4    | 0007.0e03.110d | efrule-q5d | 1879076068           | Jan1                 | 03:35:05            | Jan1 03:45:06        | Act         |
| 5    | 0007.0e03.1431 | efrule-q5  | 120052387            | Jan1                 | 03:44:18            | Jan1 03:54:18        | Act         |
| 6    | 0007.0e03.1431 | efrule-q5d | 1838493626           | Jan1                 | 03:34:55            | Jan1 03:44:55        | Act         |
| 7    | 0007.0e03.1445 | efrule-q5  | 120919427            | Jan1                 | 03:44:08            | Jan1 03:54:08        | Act         |
| 8    | 0007.0e03.1445 | efrule-q5d | 1865955172           | Jan1                 | 03:35:06            | Jan1 03:45:06        | Act         |
| 9    | 0007.0e03.1225 | efrule-q5  | 120200155            | Jan1                 | 03:44:18            | Jan1 03:54:18        | Act         |
| 10   | 0007.0e03.1225 | efrule-q5d | 1839681070           | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 11   | 0007.0e03.0cb1 | efrule-q5  | 122941643            | Jan1                 | 03:43:58            | Jan1 03:53:58        | Act         |
| 12   | 0007.0e03.0cb1 | efrule-q5d | 1889107176           | Jan1                 | 03:35:06            | Jan1 03:45:06        | Act         |
| 13   | 0007.0e03.1435 | efrule-q5  | 119504795            | Jan1                 | 03:44:18            | Jan1 03:54:18        | Act         |
| 14   | 0007.0e03.1435 | efrule-q5d | 1835164034           | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 15   | 0007.0e02.f80d | efrule-q5  | 119250047            | Jan1                 | 03:44:18            | Jan1 03:54:18        | Act         |
| 16   | 0007.0e02.f80d | efrule-q5d | 1832034114           | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 17   | 0007.0e03.1469 | efrule-q5  | 117562137            | Jan1                 | 03:44:18            | Jan1 03:54:18        | Act         |
| 18   | 0007.0e03.1469 | efrule-q5d | 1816957486           | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 19   | 0007.0e03.11f9 | efrule-q5  | 124265775            | Jan1                 | 03:44:18            | Jan1 03:54:18        | Act         |
| 20   | 0007.0e03.11f9 | efrule-q5d | 1959957066           | Jan1                 | 03:35:46            | Jan1 03:45:46        | Act         |
| 21   | 0007.0e03.1461 | efrule-q5  | 113314731            | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 22   | 0007.0e03.1461 | efrule-q5d | 1827583110           | Jan1                 | 03:35:46            | Jan1 03:45:46        | Act         |
| 23   | 0007.0e03.11d9 | efrule-q5  | 104607787            | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 24   | 0007.0e03.11d9 | efrule-q5d | 1675444338           | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 25   | 0007.0e03.1475 | efrule-q5  | 113751019            | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 26   | 0007.0e03.1475 | efrule-q5d | 1841060070           | Jan1                 | 03:35:56            | Jan1 03:45:56        | Act         |
| 27   | 0007.0e03.10d9 | efrule-q5  | 113713981            | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 28   | 0007.0e03.10d9 | efrule-q5d | 1840272262           | Jan1                 | 03:35:56            | Jan1 03:45:56        | Act         |
| 29   | 0007.0e03.1065 | efrule-q5  | 113443243            | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |
| 30   | 0007.0e03.1065 | efrule-q5d | 1834855264           | Jan1                 | 03:35:56            | Jan1 03:45:56        | Act         |
| 31   | 0007.0e03.1081 | efrule-q5  | 119843737            | Jan1                 | 03:44:18            | Jan1 03:54:18        | Act         |
| 32   | 0007.0e03.1081 | efrule-q5d | 1852632338           | Jan1                 | 03:35:56            | Jan1 03:45:56        | Act         |
| 33   | 0007.0e03.1179 | efrule-q5  | 118522795            | Jan1                 | 03:44:18            | Jan1 03:54:18        | Act         |
| 34   | 0007.0e03.1179 | efrule-q5d | 1834693996           | Jan1                 | 03:35:56            | Jan1 03:45:56        | Act         |
| 35   | 0007.0e03.1471 | efrule-q5  | 122182565            | Jan1                 | 03:43:58            | Jan1 03:53:58        | Act         |
| 36   | 0007.0e03.1471 | efrule-q5d | 1881390866           | Jan1                 | 03:34:55            | Jan1 03:44:55        | -           |

**show cable subscriber-usage**

```

37 0007.0e03.1341 efrule-q5 129557931 Jan1 03:43:48 Jan1 03:53:48 Act
38 0007.0e03.1341 efrule-q5d 2016792338 Jan1 03:35:56 Jan1 03:45:56 Act

```

The following example shows typical output for subscribers on a particular cable interface:

```
Router# show cable subscriber-usage c6/0/0
```

| Sfid | Mac Address    | Enforce-rule Name | Total-Kbyte Count | Last-detect time | Last-penalty time | Pen Flag |
|------|----------------|-------------------|-------------------|------------------|-------------------|----------|
| 7    | 0007.0e03.2cad | test1             | 0                 | Jan1 00:00:00    | Jan1 00:00:00     | -        |
| 9    | 0007.0e03.2c45 | test1             | 0                 | Jan1 00:00:00    | Jan1 00:00:00     | -        |

The following example shows typical output for the **show cable subscriber-usage** command for one upstream on a particular cable interface:

```
Router# show cable subscriber-usage c6/0/1 upstream 0
```

| Sfid | Mac Address    | Enforce-rule Name | Total-Kbyte Count | Last-detect time | Last-penalty time | Pen Flag |
|------|----------------|-------------------|-------------------|------------------|-------------------|----------|
| 5    | 0007.0e03.2c25 | test1             | 0                 | Jan1 00:00:00    | Jan1 00:00:00     | -        |

The following example shows typical output for the **sort-byte-count** option for the **show cable subscriber-usage** command:

```
Router# show cable subscriber-usage sort-byte-count
```

| Sfid | Mac Address    | Enforce-rule Name | Total-Kbyte Count | Last-detect time | Last-penalty time | Pen Flag |
|------|----------------|-------------------|-------------------|------------------|-------------------|----------|
| 7    | 0007.0e03.2cad | test1             | 65157114          | Feb24 11:36:34   | Mar3 11:36:34     | Act      |
| 9    | 0007.0e03.2c45 | test1             | 16381014          |                  |                   | -        |
| 5    | 0007.0e03.2c25 | test1             | 13440960          |                  |                   | -        |

Table 164 describes the fields shown by the **show cable subscriber-usage** command.

**Table 164** *show cable subscriber-usage Field Descriptions*

| Field             | Description                                                                                                                                                                                                                                                        |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SFID              | Number of the Service Flow ID.                                                                                                                                                                                                                                     |
| Mac Address       | Hardware address (MAC address) of the subscriber's cable modem.                                                                                                                                                                                                    |
| Enforce-rule Name | Name of the enforce-rule being applied to this subscriber.                                                                                                                                                                                                         |
| Total-Kbyte       | Total number of kilobytes consumed by the subscriber's cable modem during the last monitoring-duration window.<br><b>Note</b> The total byte count is reset to 0 whenever an enforce-rule's configuration is changed.                                              |
| Last-detect time  | Last time period, if any, at which it was determined that the cable modem was using more bandwidth than allowed by their QoS profile. This value also shows the time at which the enforced QoS profile was automatically applied, if this option has been enabled. |
| Last-penalty time | If an enforced QoS profile is currently in effect, this field shows the time period at which the subscriber's current penalty time expires, at which point their original registered QoS profile is restored.                                                      |
| Pen Flag          | Identifies whether a penalty enforce-rule has been applied to this cable modem.                                                                                                                                                                                    |

## Related Commands

| Command                            | Description                                                                                                                               |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>activate-rule at-byte-count</b> | Specifies the number of bytes that a subscriber can transmit during the monitoring period on a Cisco CMTS router.                         |
| <b>cable qos enforce-rule</b>      | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
| <b>duration</b>                    | Specifies the time period and sample rate to be used for monitoring subscribers.                                                          |
| <b>enabled (enforce-rule)</b>      | Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS Router.                                                |
| <b>penalty-period</b>              | Specifies the time period that an enforced QoS profile should be in effect for subscribers who violate their registered QoS profiles.     |
| <b>qos-profile enforced</b>        | Specifies a QoS profile that should be enforced when users violate their registered QoS profiles.                                         |
| <b>qos-profile registered</b>      | Specifies the registered QoS profile that should be used for this enforce-rule.                                                           |
| <b>show cable qos enforce-rule</b> | Displays the QoS enforce-rules that are currently defined.                                                                                |

# show cable tech-support

To display general information about the router when reporting a problem, use the **show cable tech-support** command in privileged EXEC mode.

**show cable tech-support** {*slot/port* | *slot/subslot/port*}

|                    |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>slot/port</i>         | (Optional) Cisco IOS Release 12.3(9a)BC allows you to display information about one specific cable interface.<br><br>Identifies the cable interface and downstream port on the Cisco uBR7100 series and Cisco uBR7200 series routers.<br><br>On the Cisco uBR7100 series router, the only valid value is <b>1/0</b> . On the Cisco uBR7200 series router, <i>slot</i> can range from 3 to 6, and <i>port</i> can be 0 or 1, depending on the cable interface. |
|                    | <i>slot/subslot/port</i> | (Optional) Cisco IOS Release 12.3(9a)BC allows you to display information about one specific cable interface.<br><br>Identifies the cable interface on the Cisco uBR10012 router. The following are the valid values: <ul style="list-style-type: none"> <li><i>slot</i> = 5 to 8</li> <li><i>subslot</i> = 0 or 1</li> <li><i>port</i> = 0 to 4 (depending on the cable interface)</li> </ul>                                                                |

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                                                                                                                                                                                                                                                                                                             |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.2        | This command was introduced.                                                                                                                                                                                                                                                                                             |
|                 | 12.1(1a)T1  | This command was modified to include information about the cable clock card.                                                                                                                                                                                                                                             |
|                 | 12.2(15)BC2 | This command added several <b>show pxf</b> commands to the display on the Cisco uBR10012 router.                                                                                                                                                                                                                         |
|                 | 12.3(9a)BC  | The output of the command was significantly shortened by moving a number of <b>show</b> commands (the ones that display information about individual cable modems) to the <b>show tech-support</b> command. This release also adds support for an option to display information about only one specific cable interface. |

**Usage Guidelines** The **show cable tech-support** command displays a large amount of configuration, run-time status, and other information about the cable interfaces on the Cisco CMTS. The output of this command can be provided to technical support representatives when reporting a problem.



**Note**

The **show tech-support** includes most of the information shown in the **show cable tech-support** command. Unless the problem is clearly cable-specific, TAC personnel will typically request the **show tech-support** output to troubleshoot any problems.

The **show cable tech-support** command displays the output of a number of different show commands. The exact output depends on the platform, configuration, and type of protocols being used. Typically, the output includes the output from the following commands:

- **show cable modem**
- **show cable flap-list**
- **show cable qos profile**
- **show cable modulation-profile**
- **show cable spectrum-group**
- **show cable hop**
- **show interface cable sid (for each cable interface)**
- **show interface cable sid connectivity (for each cable interface)**
- **show interface cable downstream**
- **show interface cable upstream**
- **show interface cable mac-scheduler**

show interface cable modem Other commands could be included in the **show cable tech-support** output, depending on the CMTS platform, the Cisco IOS software being used, and the cards that are installed in the chassis.

On the Cisco uBR10012 router, the following commands also appear in Cisco IOS Release 12.2(15)BC2 and later releases:

- **show pxf cpu statistics**
- **show pxf cpu subblocks**
- **show pxf cpu buffer**
- **show pxf dma**
- **show pxf cpu cef memory**
- **show pxf cpu queue**
- **show pxf cpu statistics drop**

**Tip**

Depending on the platform and configuration, the output from the **show cable tech-support** command can easily exceed the buffers found in most communications programs. To capture this output so it can be sent to Cisco TAC, use a Telnet program that allows you to capture the output directly to disk.

## Examples

The following abbreviated example illustrates the cable modem and interface information for the Cisco uBR10012 router on which Cisco IOS Release 12.3(9a)BC is installed.

```
Router# show cable tech-support

----- Slot 8/1 -----
----- show cable modem Cable8/1/0 -----
MAC Address IP Address I/F MAC Prim RxPwr Timing Num BPI
State Sid (dB) Offset CPE Enb

----- show cable modem Cable8/1/0 connectivity -----
Prim 1st time Times %online Online time Offline time
Sid online Online min avg max min avg max

----- show interface Cable8/1/0 sid -----
Sid Prim MAC Address IP Address Type Age Admin Sched Sfid
State Type

----- show interface Cable8/1/0 sid counter -----
Sid Req-polls BW-reqs Grants Packets Frag Concatpkts
issued received issued received complete received

----- show interface Cable8/1/0 sid association -----
Sid Prim Online IP Address MAC Address Interface VRF Name

----- show interface Cable8/1/0 modem 0 -----
SID Priv bits Type State IP address method MAC address

----- show cable modem Cable8/1/1 -----
MAC Address IP Address I/F MAC Prim RxPwr Timing Num BPI
State Sid (dB) Offset CPE Enb

----- show cable modem Cable8/1/1 connectivity -----
Prim 1st time Times %online Online time Offline time
Sid online Online min avg max min avg max

----- show interface Cable8/1/1 sid -----
Sid Prim MAC Address IP Address Type Age Admin Sched Sfid
State Type

----- show interface Cable8/1/1 sid counter -----
Sid Req-polls BW-reqs Grants Packets Frag Concatpkts
issued received issued received complete received

----- show interface Cable8/1/1 sid association -----
Sid Prim Online IP Address MAC Address Interface VRF Name

----- show interface Cable8/1/1 modem 0 -----
SID Priv bits Type State IP address method MAC address
```



## Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

| Related Commands | Command                                | Description                                                                                                                                 |
|------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>show controllers cable</b>          | Displays information about a specific line card's interface controllers.                                                                    |
|                  | <b>show interface cable downstream</b> | Displays information about the cable interface.                                                                                             |
|                  | <b>show running-config</b>             | Displays the current run-time configuration.                                                                                                |
|                  | <b>show startup-config</b>             | Displays the configuration that was used to initially configure the CMTS at system startup.                                                 |
|                  | <b>show tech-support</b>               | Displays the output from <b>show</b> commands that display the router's configuration and run-time status.                                  |
|                  | <b>show version</b>                    | Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images. |

# show cable throttle-modem

To display cable modem (CM) throttle information, use the **show cable throttle-modem** command in user EXEC or privileged EXEC mode.

**show cable throttle-modem**

**Syntax Description**      This command has no arguments or keywords.

**Command Default**      None

**Command Modes**      User EXEC (>),  
Privileged EXEC (#)

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.2(33)SCF3 | This command was introduced. |

**Examples**      The following is a sample output of the **show cable throttle-modem** command when the Cable Modem Registration Throttling feature is disabled:

```
Router# show cable throttle-modem

CPU for five seconds: 4%/0%; one minute: 1%; five minutes: 1%
CM Throttle Status : Config Disabled; Oper Disabled;
CM Throttle Config : Init Rate 32 CM/Sec; Holdoff 45 Sec;
Flush Rate 300 CM/Sec
CM Register Rate : 0 CM/Sec
```

The following is a sample output of the **show cable throttle-modem** command when the Cable Modem Registration Throttling feature is enabled:

```
Router# show cable throttle-modem

CPU for five seconds: 5%/0%; one minute: 1%; five minutes: 1%
CM Throttle Status : Config Enabled; Oper Enabled;
CM Throttle Config : Init Rate 32 CM/Sec; Holdoff 45 Sec;
Flush Rate 300 CM/Sec
CM Register Rate : 0 CM/Sec
CM Throttling Rate : 4 CM/Sec
Num of CM in Queue : 0
```

Table 165 describes the significant fields shown in the display.

**Table 165** *show cable throttle-modem Field Descriptions*

| Field                | Description                                                                                                                                                                           |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CPU for five seconds | CPU usage information.                                                                                                                                                                |
| CM Throttle Status   | CM throttle operating status. The valid values are: <ul style="list-style-type: none"> <li>Config Enabled—Feature is enabled.</li> <li>Oper Enabled—Feature is functional.</li> </ul> |
| CM Throttle Config   | CM throttle configuration parameters.                                                                                                                                                 |
| CM Register Rate     | Information about the current cable modem registration success rate.                                                                                                                  |
| CM Throttling Rate   | Dynamic cable modem throttle rate from the waiting queue, adjusted according to CPU usage, capped by the init-rate value.                                                             |
| Num of CM in Queue   | Number of CMs in the queue.                                                                                                                                                           |

#### Related Commands

| Command                     | Description                                              |
|-----------------------------|----------------------------------------------------------|
| <b>cable throttle-modem</b> | Enables the Cable Modem Registration Throttling feature. |

# show cable upstream service-flow summary

To display the upstream service flow summary information on the Cisco CMTS router, use the **show cable upstream service-flow summary** command in privileged EXEC mode.

**show cable upstream service-flow summary**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

**Examples** The following is a sample output of the **show cable upstream service-flow summary** command:

```
Router# show cable upstream service-flow summary

Interface Static Upstream Service Flow Dynamic Upstream Service Flow Desc
 Total PRI BE UGS UGS-AD RTPS N-RTPS BE UGS UGS-AD RTPS N-RTPS
C7/0/0/U0 3 0 0 0 0 3 0 0 0 0 0 0
C7/0/0/U2 21 4 12 0 0 9 0 0 0 0 0 0
C7/0/0/U3 20 5 15 0 0 5 0 0 0 0 0 0
C7/0/0/UB1 24 8 24 0 0 0 0 0 0 0 0 0 UBG1
C7/1/0/U2 4 1 3 0 0 1 0 0 0 0 0 0
C7/1/1/U2 1 1 1 0 0 0 0 0 0 0 0 0
C8/0/0/U0 1 1 1 0 0 0 0 0 0 0 0 0
C8/0/0/U1 1 0 0 0 0 1 0 0 0 0 0 0
C8/0/0/U2 1 0 0 0 0 1 0 0 0 0 0 0
C8/0/0/U3 1 0 0 0 0 1 0 0 0 0 0 0
C8/0/0/UB3 5 2 5 0 0 0 0 0 0 0 0 0
C8/0/0/UB8 4 1 4 0 0 0 0 0 0 0 0 0
Total: 86 23 65 0 0 21 0 0 0 0 0 0
```

Table 114 describes the significant fields shown in the display.

**Table 166** show cable upstream service-flow summary Field Descriptions

| Field     | Description                                                                 |
|-----------|-----------------------------------------------------------------------------|
| Interface | Cable interface.                                                            |
| Total     | Total number of upstream service flows.                                     |
| PRI       | Number of primary upstream service flows.                                   |
| BE        | Number of best effort service schedule types.                               |
| UGS       | Number of unsolicited grant service schedule types.                         |
| UGS-AD    | Number of unsolicited grant service with activity detection schedule types. |
| RTPS      | Number of real-time polling service schedule types.                         |

**Table 166** *show cable upstream service-flow summary Field Descriptions (continued)*

| Field       | Description                                             |
|-------------|---------------------------------------------------------|
| N-RTPS      | Number of non-real-time polling service schedule types. |
| Description | Descriptive name for the bonding group.                 |

#### Related Commands

| Command                                | Description                                                                                     |
|----------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>show interface cable</b>            | Displays configuration and status information for the cable interface on the Cisco CMTS router. |
| <b>show interface cable downstream</b> | Displays information about the downstream cable interface on the Cisco CMTS router.             |

# show cable urm

To view the connector group table information on a Cisco uBR-MC3GX60V cable interface line card, use the **show cable urm** command in the privileged EXEC mode. The connector group table provides information about the cable MAC domain upstream channel to connector mapping of a physical upstream channel.

**show cable urm** [*slot/subslot*]

|                    |                     |                                                                                                                                                                                                                                                                         |
|--------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>slot/subslot</i> | Identifies the cable interface on the Cisco uBR10012 router. <ul style="list-style-type: none"> <li>slot—Slot where the line card resides. The valid range is from 5 to 8.</li> <li>subslot—Subslot where the line card resides. Available slots are 0 or 1.</li> </ul> |
|--------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                               |
|-----------------|-------------------------------------------------------------------------------|
| Command Default | Display information for all the slot/subslot values that has been configured. |
|-----------------|-------------------------------------------------------------------------------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCE | This command was introduced. |

**Examples** The following is a sample output indicating the connector group table information of the cable line card in slot 6/1:

```
Router# show cable urm 6/1
===
connector group table
===
card cnrns md:us=>cnr
6/1 0-3 3:2=> 1 *empty* *empty* *empty* *empty* *empty*
 empty *empty* *empty* *empty* *empty* *empty*
 4-7 *empty* *empty* *empty* *empty* *empty* *empty*
 empty *empty* *empty* *empty* *empty* *empty*
 8-11 *empty* *empty* *empty* *empty* *empty* *empty*
 empty *empty* *empty* *empty* *empty* *empty*
 12-15 *empty* *empty* *empty* *empty* *empty* *empty*
 empty *empty* *empty* *empty* *empty* *empty*
 16-19 *empty* *empty* *empty* *empty* *empty* *empty*
 empty *empty* *empty* *empty* *empty* *empty*
```

Table 167 describes the significant fields shown in the display.

Table 167 show cable urm Field Descriptions



| Field      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| card       | The slot/subslot information of the card.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| cnrs       | The connector index range of connectors in a connector group. The values for the Cisco uBR-MC3GX60V, Cisco UBR-MC20X20V, and the Cisco uBR10-MC5X20U line cards are 0-19.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| md:us=>cnr | The MAC domain upstream channel to connector mapping information of a physical upstream channel. The entry position corresponding to a physical upstream channel index in a connector group. For uBR-MC3GX60V line card, there are 12 physical upstream channels in each connector group. For the UBR-MC20X20V and uBR10-MC5X20U line cards, there are 2 channels in each group. In the example, C6/1/3:U2 is mapped to connector 1 in the running config by the user using connector command. Internally, CMTS software maps C6/1/3:U2 to physical upstream channel 0 (1st entry) in the 0-3 connector group. |

#### Related Commands

| Command                                    | Description                                            |
|--------------------------------------------|--------------------------------------------------------|
| <b>show running-config interface cable</b> | Shows the MD:US connector mapping configured by users. |

# show cable us-sg

To display the upstream service groups configured on all cable interfaces of a Cisco CMTS router, use the **show cable us-sg** command in privileged EXEC mode.

**show cable us-sg**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                  |
|-----------------|-------------|---------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Examples** The following is a sample output of the **show cable us-sg** command.

```
Router# show cable us-sg

Cable MD 5/0/0
 US-SG-ID : 1 US-Chan : U0,1,2,3,4,5
 Primary-DS: 1/0/0:0 US-SG-ID: 1
 MDD US-List : U0,1,2,3,4,5
 MDD Ambiguity : U0,1,2,3,4,5

Cable MD 6/0/0
 US-SG-ID : 1 US-Chan : U0,1,2,3
 Primary-DS: 1/0/0:4 US-SG-ID: 1
 MDD US-List : U0,1,2,3
 MDD Ambiguity : U0,1,2,3

Cable MD 7/0/0
 US-SG-ID : 1 US-Chan : U0,1,2,3
 Primary-DS: 7/0/0:0 US-SG-ID: 1
 MDD US-List : U0,1,2,3
 MDD Ambiguity : U0,1,2,3
 Primary-DS: 7/0/0:1 US-SG-ID: 1
 MDD US-List : U0,1,2,3
 MDD Ambiguity : U0,1,2,3
```

Table 1 shows the significant fields shown in the display:

**Table 168** show interface cable service-flow Field Descriptions

| Field      | Description                                         |
|------------|-----------------------------------------------------|
| US-SG-ID   | Upstream service group ID.                          |
| US-Chan    | Upstream channels on the cable interface line card. |
| Primary-DS | Primary downstream interafcee.                      |

**Table 168** *show interface cable service-flow Field Descriptions (continued)*

| Field         | Description                                                                                 |
|---------------|---------------------------------------------------------------------------------------------|
| MDD US-List   | MAC management message: MDD TLV type 7 content, upstream active channel list.               |
| MDD Ambiguity | MAC management message: MDD TLV type 8 content, upstream ambiguity resolution channel list. |

#### Related Commands

| Command                                             | Description                                                                               |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>show cable mac-domain upstream-service-group</b> | Displays runtime statistics of the upstream service group on a cable interface line card. |

■ show cable us-sg



## Cable Commands: show ch through show cr

Revised: August 12, 2013, OL-15510-17

### New Commands

| Command                                 | Cisco IOS Software Release |
|-----------------------------------------|----------------------------|
| show cr10k-rp cable                     | 12.2(33)SCA                |
| show cr10k-rp controller                | 12.2(33)SCA                |
| show cr10k-rp queue                     | 12.2(33)SCA                |
| show cr10k-rp slots                     | 12.2(33)SCA                |
| show controller integrated-cable        | 12.2(33)SCC                |
| show controller gigabitethernet         | 12.2(33)SCE                |
| show cmts ipc-cable client base service | 12.2(33)SCF                |
| show controllers cable jib              | 12.2(33)SCF                |

### Modified Commands

| Command                          | Cisco IOS Software Release |
|----------------------------------|----------------------------|
| show controllers cable           | 12.3(23)BC                 |
| show controllers modular-cable   | 12.3(23)BC5                |
| show controllers jacket          | 12.2(33)SCB                |
| show cr10k-rp controller         | 12.2(33)SCB                |
| show cr10k-rp queue              | 12.2(33)SCB                |
| show controllers modular-cable   | 12.3(23)BC6                |
| show controllers cable           | 12.2(33)SCC                |
| show controllers modular-cable   | 12.2(33)SCC                |
| show controller integrated-cable | 12.2(33)SCE                |
| show controllers cable           | 12.2(33)SCE                |
| show controllers modular-cable   | 12.2(33)SCE                |
| show controllers cable           | 12.2(33)SCF                |

| Command                        | Cisco IOS Software Release |
|--------------------------------|----------------------------|
| show cr10k-rp controller       | 12.2(33)SCF                |
| show controllers cable         | 12.2(33)SCG                |
| show controllers modular-cable | 12.2(33)SCG                |
| show controllers modular cable | 12.2(33)SCH                |

#### Obsolete Commands

| Command                                  | Effective Cisco IOS Release |
|------------------------------------------|-----------------------------|
| show controllers cable upstream spectrum | 12.3(21)BC                  |
| show cr10k-rp                            | 12.2(33)SCB                 |
| show cr10k-rp service-flow ds            | 12.2(33)SCB                 |

# show checkpoint

To display information about the Checkpoint Facility (CF) subsystem on a Cisco CMTS, use the **show checkpoint** command in privileged EXEC mode.

**show checkpoint** { **clients** [*client-id*] | **entities** | **statistics** }

## Syntax Description

|                   |                                                        |
|-------------------|--------------------------------------------------------|
| <b>clients</b>    | Displays a list of current checkpoint clients.         |
| <i>client-id</i>  | (Optional) Particular client statistics.               |
| <b>entities</b>   | Displays a list of current checkpoint entities.        |
| <b>statistics</b> | Displays the current status for checkpoint operations. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                         |
|-------------|--------------------------------------------------------------------------------------|
| 12.2(11)BC3 | This command was introduced to support High Availability (HA) redundancy operations. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                           |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                      |

## Usage Guidelines

The Checkpoint Facility (CF) subsystem manages the passing of messages from the Active to Standby interfaces. It also handles sequencing and throttling, as needed during redundancy operations. Checkpoint clients, such as line cards and other subsystems, register with the CF subsystem so that they can update the Protect card or standby processor with state changes as necessary.

The **show checkpoint** command displays information about the clients (other processes on the CMTS that are sending checkpoint messages), entities, and run-time status for checkpoint operations.

The **show checkpoint clients** *client-id* command displays information about the client with a particular client ID.

## Examples

The following shows typical output for the **show checkpoint clients** command:

```
Router# show checkpoint clients
```

```
Check Point List of Clients
```

```
CHKPT on ACTIVE server.
```

| Client Name    | Client ID | Msg Send<br>(number of) | Msg len<br>(Total) | Bundling |
|----------------|-----------|-------------------------|--------------------|----------|
| CHKPT DevTest  | 3         | 0                       | 0                  | On       |
| CHKPT EXAMPLE  | 2         | 0                       | 0                  | On       |
| CR10K RP CHKPT | 20        | 0                       | 0                  | On       |

```
Router#
```

The following shows typical output for the **show checkpoint clients** command with the *client-id* parameter:

Router# **show checkpoint clients 1**

```

Client Name Client Entity Bundle
 ID ID Mode

CHKPT Test client 1 -- On

Total API Messages Sent: 0
Total Transport Messages Sent: 0
Length of Sent Messages: 0
Total Blocked Messages Sent: 0
Length of Sent Blocked Messages: 0
Total Non-blocked Messages Sent: 0
Length of Sent Non-blocked Messages: 0
Total Messages Received: 0
Total Rcv Message Len: 0
Total Bytes Allocated: 0
Buffers Held: 0
Huge Buffers Requested: 0
Transport Frag Count: 0
Transport Frag Peak: 0
Transport Sends w/Flow Off: 0
Send Errs: 0
Send Peer Errs: 0
Rcv Xform Errs: 0
Xmit Xform Errs: 0
Incompatible Messages: 0
Client Unbundles to Process Memory: T

```

Router#

The following shows typical output for the **show checkpoint entities** command:

Router# **show checkpoint entities**

```

 Check Point List of Entities
CHKPT on ACTIVE server.

Entity Name Entity
 ID

UBR10k HA Entity Gro 4
Total API Messages Sent: 0
Total IPC Sent: 0
Total Message Len: 0
Total Bytes Allocated: 0

```



The following shows typical output for the **show checkpoint statistics** command:

```
Router# show checkpoint statistics

Check Point Status

CHKPT on ACTIVE server.

Number of chkpt messages currently in hold queue 0
CHKPT MAX MTU size = 1422
IPC MAX MTU size = 4096
CHKPT Pending msg timer = 100 ms

Router#
```

**Related Commands**

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>hccp authentication</b> | Changes the minimum time between frequency hops.                                                                                     |
| <b>hccp check version</b>  | Exits bypass version mode, and returns to normal HCCP operation.                                                                     |
| <b>hccp ds-switch</b>      | Specifies the downstream upconverter module for a Working CMTS or Protect CMTS (deprecated command).                                 |
| <b>hccp protect</b>        | Allows you to configure a Cisco CMTS to be a Protect CMTS for a specified Working CMTS in a 1+1 redundancy environment.              |
| <b>hccp working</b>        | Allows you to designate a Cisco CMTS to be a Working CMTS in a 1+1 redundancy environment.                                           |
| <b>show hccp</b>           | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured.        |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# show cmts ipc-cable client base

To display the interprocess communication (IPC) session status, the service information for all the slots and subslots on the line cards, and statistics for each session on the Cisco uBR10012 router, use the **show cmts ipc-cable client base** command in user EXEC or privileged EXEC mode.

**show cmts ipc-cable client base {client | service | stats}**

|                    |                |                                                                                        |
|--------------------|----------------|----------------------------------------------------------------------------------------|
| Syntax Description | <b>client</b>  | Displays the IPC session status information.                                           |
|                    | <b>service</b> | Displays all the IPC services for the slots and subslots on the Cisco uBR10012 router. |
|                    | <b>stats</b>   | Displays the IPC layer statistics information for every session.                       |

**Command Default** No default behavior or values.

**Command Modes** User EXEC (>) or  
Privileged EXEC (#)

| Command History | Release     | Modification                                          |
|-----------------|-------------|-------------------------------------------------------|
|                 | 12.2(33)SCB | This command was introduced.                          |
|                 | 12.2(33)SCF | The <b>service</b> keyword was added to this command. |

**Usage Guidelines**

The **show cmts ipc-cable client base client** command displays the IPC session information for a group of messages that are exchanged between a route processor (RP) and a line card or between two line cards. This information includes the client ID, client name, IPC transport information, slot and subslot information, session state to identify whether the session is ready for message exchange, number of messages that are pending, and number of messages dropped.

The **show cmts ipc-cable client base service** command displays the IPC service information for all the slots and subslots on the Cisco uBR10012 router. This information includes IPC port information, such as type of service and port ID, retry and timeout information of the IPC messages, and watermark information in the request queue.

The **show cmts ipc-cable client base stats** command displays the IPC layer error statistics for every session and is used for internal debugging purposes. The error statistics information includes the client ID, client name, transport type, slot and subslot information, client buffer, IPC layer state, error counter information for the sent and received messages, and IPC In Service Software Upgrade (ISSU) register information.

**Examples**

The following is a sample output of the **show cmts ipc-cable client base client** command:

Router# **show cmts ipc-cable client base client**

Client Id: 0      Name: CLNT DOCSIS

| Slot/Subslot | Seat    | ISSU   | Sid | Connection | State | Ready | Transport | Msg-Pending | Msg-D |
|--------------|---------|--------|-----|------------|-------|-------|-----------|-------------|-------|
| 5/0          | 0x70000 | 17     |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |
| 6/1          | 0x50000 | 65540  |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |
| 8/0          | 0x60000 | 589827 |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |

Client Id: 1      Name: CLNT HCCP

| Slot/Subslot | Seat    | ISSU   | Sid | Connection | State | Ready | Transport | Msg-Pending | Msg-D |
|--------------|---------|--------|-----|------------|-------|-------|-----------|-------------|-------|
| 5/0          | 0x70000 | 17     |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |
| 6/1          | 0x50000 | 65540  |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |
| 8/0          | 0x60000 | 589827 |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |

Client Id: 2      Name: CLNT PKTCBL

| Slot/Subslot | Seat    | ISSU   | Sid | Connection | State | Ready | Transport | Msg-Pending | Msg-D |
|--------------|---------|--------|-----|------------|-------|-------|-----------|-------------|-------|
| 5/0          | 0x70000 | 17     |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |
| 6/1          | 0x50000 | 65540  |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |
| 8/0          | 0x60000 | 589827 |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |

Client Id: 3      Name: CLNT PNEGO

| Slot/Subslot | Seat    | ISSU   | Sid | Connection | State | Ready | Transport | Msg-Pending | Msg-D |
|--------------|---------|--------|-----|------------|-------|-------|-----------|-------------|-------|
| 5/0          | 0x70000 | 17     |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |
| 6/1          | 0x50000 | 65540  |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |
| 8/0          | 0x60000 | 589827 |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |        |     |            |       |       |           |             |       |

Client Id: 4      Name: CLNT PLATFORM

| Slot/Subslot | Seat    | ISSU  | Sid | Connection | State | Ready | Transport | Msg-Pending | Msg-D |
|--------------|---------|-------|-----|------------|-------|-------|-----------|-------------|-------|
| 5/0          | 0x70000 | 17    |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |       |     |            |       |       |           |             |       |
| 6/1          | 0x50000 | 65540 |     | RP-CLC     | Up    | Yes   | IPC       | 0           | 0     |
|              | 32      |       |     |            |       |       |           |             |       |

!  
.  
.  
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Table 169 describes the significant fields shown in the display.

**Table 169** *show cmts ipc-cable client base client Field Descriptions*

| Field        | Description                                              |
|--------------|----------------------------------------------------------|
| Client Id    | ISSU client ID.                                          |
| Name         | Client session name.                                     |
| Slot/subslot | Slot and subslot.                                        |
| Seat         | IPC seat number for the session.                         |
| ISSU Sid     | ISSU application client session service identifier.      |
| Connection   | Connection type.                                         |
| State        | Connection state that is established.                    |
| Ready        | Readiness of the session.                                |
| Transport    | Transport stream that is used.                           |
| Msg-Pending  | Total number of messages waiting for acknowledgement.    |
| Msd-Dropped  | Total number of messages dropped.                        |
| ISSU MTU     | IPC Maximum Transmission Unit (MTU) of the ISSU session. |

The following is a sample output of the **show cmts ipc-cable client base service** command:

Router# **show cmts ipc-cable client base service**

```

CMTS IPC service 1/0: default
 ipc_port_info = 0x69390F4 ipc_port_id = A0000
 retry_max = 20 retry_period = 1 rpc_timeout = 120
 context = 0x6939164 pid = 399 name = ReqXmt 1/0: default
in_transit = 0 reqQ size = 0 inband = False
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = True block_done = False

CMTS IPC service 3/0: default
 ipc_port_info = 0x6939084 ipc_port_id = B0000
 retry_max = 20 retry_period = 1 rpc_timeout = 120
 context = 0x6937FE4 pid = 405 name = ReqXmt 3/0: default
in_transit = 0 reqQ size = 0 inband = False
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = True block_done = False

CMTS IPC service 5/0: default
 ipc_port_info = 0x465C0C14 ipc_port_id = D000A
 retry_max = 20 retry_period = 1 rpc_timeout = 120
 context = 0x6937874 pid = 420 name = ReqXmt 5/0: default
in_transit = 0 reqQ size = 0 inband = False
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = True block_done = True

CMTS IPC service 5/0: inband
 ipc_port_info = 0xE6C7F50 ipc_port_id = D000B
 retry_max = 20 retry_period = 1 rpc_timeout = 20
 context = 0x6937644 pid = 424 name = ReqXmt 5/0: inband
in_transit = 0 reqQ size = 0 inband = True
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = False block_done = False

```

```

CMTS IPC service 5/0: expedite
 ipc_port_info = 0x34C3FA4 ipc_port_id = D000C
 retry_max = 3 retry_period = 1 rpc_timeout = 5
 context = 0x69380C4 pid = 353 name = ReqXmt 5/0: expedite
in_transit = 0 reqQ size = 0 inband = False
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = True block_done = False

CMTS IPC service 5/0: non critical
 ipc_port_info = 0x4CFFBD34 ipc_port_id = D000D
 retry_max = 3 retry_period = 10 rpc_timeout = 30
 context = 0x6937954 pid = 419 name = ReqXmt 5/0: non critical
in_transit = 0 reqQ size = 0 inband = False
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = False block_done = False

CMTS IPC service 5/1: default
 ipc_port_info = 0x6938134 ipc_port_id = C000A
 retry_max = 20 retry_period = 1 rpc_timeout = 120
 context = 0x69387C4 pid = 226 name = ReqXmt 5/1: default
in_transit = 0 reqQ size = 0 inband = False
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = True block_done = True

CMTS IPC service 5/1: inband
 ipc_port_info = 0x34C1F4C ipc_port_id = C000B
 retry_max = 20 retry_period = 1 rpc_timeout = 20
in_transit = 0 reqQ size = 0 inband = True
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = False block_done = False

CMTS IPC service 5/1: expedite
 ipc_port_info = 0x2DFFF38 ipc_port_id = C000C
 retry_max = 3 retry_period = 1 rpc_timeout = 5
 context = 0x465B73D4 pid = 96 name = ReqXmt 5/1: expedite
in_transit = 0 reqQ size = 0 inband = False
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = True block_done = False

CMTS IPC service 5/1: non critical
 ipc_port_info = 0x2E00100 ipc_port_id = C000D
 retry_max = 3 retry_period = 10 rpc_timeout = 30
 context = 0x465BE054 pid = 164 name = ReqXmt 5/1: non critical
in_transit = 0 reqQ size = 0 inband = False
 reqQ watermark low = 200 med = 500 high = 1000
 resume_send = False block_done = False

```

Table 170 describes the significant fields shown in the display.

**Table 170** *show cmts ipc-cable client base service Field Descriptions*

| Field                         | Description                                                                                 |
|-------------------------------|---------------------------------------------------------------------------------------------|
| CMTS IPC service 1/0: default | Slot and subslot. Describes the type of service—default, inband, expedite, or non-critical. |
| ipc_port_info                 | IPC port information.                                                                       |
| ipc_port_id                   | IPC port ID.                                                                                |
| retry_max                     | Maximum retries in Cisco IOS software IPC layer.                                            |
| retry_period                  | Time period of the retry interval in the IOS IPC layer.                                     |

**Table 170** *show cmts ipc-cable client base service Field Descriptions (continued)*

| Field          | Description                                                    |
|----------------|----------------------------------------------------------------|
| rpc_timeout    | RPC timeout value.                                             |
| context        | Context value.                                                 |
| pid            | Program identifier value.                                      |
| name           | Type of IPC service.                                           |
| in_transit     | Indicates total number of messages waiting for acknowledgement |
| inband         | Inband service type.                                           |
| reqQ size      | Size of the request queue.                                     |
| reqQ watermark | Threshold value of the queue.                                  |
| resume_send    | IPC message sent is resumed.                                   |
| block_done     | IPC message is blocked.                                        |

The following is a sample output of the **show cmts ipc-cable client base stats** command:

Router# **show cmts ipc-cable client base stats**

```

Client Id: 0 Name: CLNT DOCSIS
Slot/subslot: 5 /0 Transport Type = RP-CLC

IPC getbuffer fail : 0
IPC layer is down : 0
Sender msg has error : 0
Rcvd msg fail parser : 0
Sender drop - Misc. : 0
SID mgmt Q drop-No CM : 0
SID mgmt Q drop-Misc : 0
SID mgmt Q full : 0
SID mgmt Q drop-IF down: 0
IPC timeout : 0
IPC - no watch boolean : 0
Rcvd client no callback : 0
CR10K IPC Header transform error : 0
CR10K IPC ISSU send nego failed : 0
CR10K IPC ISSU not compatible : 0
CR10K IPC ISSU start nego failed : 0
CR10K IPC ISSU register failed : 0

```

[Table 171](#) describes the significant fields shown in the display.

**Table 171** *show cmts ipc-cable client base stats Field Descriptions*

| Field          | Description          |
|----------------|----------------------|
| Client Id      | ISSU client ID.      |
| Name           | Client session name. |
| Slot/subslot   | Slot and subslot.    |
| Transport Type | Transport type.      |

## Related Commands

| Command                     | Description                                                           |
|-----------------------------|-----------------------------------------------------------------------|
| <b>show cable ipc-stats</b> | Displays the statistics of all IPC messages on the Cisco CMTS router. |

# show controller gigabitethernet

To display information about the Gigabit Ethernet interface used by the Downstream External PHY Interface (DEPI), use the **show controller gigabitethernet** command in privileged EXEC mode.

**show controller gigabitethernet** *slot/subslot*{*bay* | *port*}

## Syntax Description

|                |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>    | <p>The slot where a SIP or cable line card resides.</p> <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>• Cisco uBR10012 router—The valid range for: <ul style="list-style-type: none"> <li>– Cable line card is from 5 to 8</li> <li>– SIP is 1 and 3</li> </ul> </li> </ul>                |
| <i>subslot</i> | <p>The subslot where a SIP or cable line card resides.</p> <ul style="list-style-type: none"> <li>• Cisco uBR10012 router—The valid value for: <ul style="list-style-type: none"> <li>– Cable line card in slot 5 to 8 is 0 or 1</li> <li>– SPAs in a SIP in slot 1 or 3, prior to Cisco IOS Release 12.2(33)SCB is 0 or 1. For Cisco IOS Release 12.2(33)SCB and later, subslot is not specified.</li> </ul> </li> </ul> |
| <i>bay</i>     | <p>The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).</p>                                                                                                                                                                                                                                                                                                                         |
| <i>port</i>    | <p>Specifies the port number.</p> <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router and Cisco uBR7225VXR router—The valid range is from 0 to 1.</li> <li>• Cisco uBR10012 router—The valid value for: <ul style="list-style-type: none"> <li>– Slot 1 and 3 is 0</li> <li>– Slot 5 to 8 is from 0 to 4</li> </ul> </li> </ul>                                                                              |

## Command Default

None.

## Command Modes

Privilege EXEC

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCE | This command was introduced. |

## Examples

This is a sample output for the **show controller gigabitethernet** command:

```
Router# show controller gigabitethernet 6/1/0
```



```

DEPI INTERFACE : GigabitEthernet6/1/0
slot : 6
subunit : 256
unit : 0
slotunit : 24
type : 27
fci : 0x65D
ph_state : 0x6
MAC : 0013.5f06.7f74
status : 0x210040
status2 : 0x80200010
state : 0x4
encsz : 14
oir : 0x0
max_pak_size : 1524
visible_bw : 10000
visible_bw_def : 10000
IB CHANNEL : 3074
Port0 Status : 1
Port1 Status : 1
DS : 11B7A40C

```

Table 172 describes the significant fields shown in the display.

**Table 172** *show controller gigabitethernet Field Descriptions*

| Field        | Description                             |
|--------------|-----------------------------------------|
| visible_bw   | Configured bandwidth for bypass traffic |
| IB CHANNEL   | Ironbus channel ID for bypass traffic   |
| Port0 Status | Status of GigE port 0                   |
| Port1 Status | Status of GigE port 1                   |

#### Related Commands

| Command                         | Description                                                          |
|---------------------------------|----------------------------------------------------------------------|
| <b>show controller ethernet</b> | Displays the hardware status of the backplane ethernet (BPE) device. |

# show controller integrated-cable

To view information about the Cisco UBR-MC20X20V or Cisco uBR-MC88V line card statistics, use the **show controller integrated-cable** command in privileged EXEC mode.

```
show controller integrated-cable {slot/port | slot/subslot/port} [all | association | bpi-entry
bpi-index | brief | config | counters {rf-channel [rf-channel] | wb-channel [wb-channel]} |
errors | fpga_version | iofpga | mapping {rf-channel [rf-channel] | wb-channel
[wb-channel]} | registers | rf-channel [rf-channel] | status | wideband-channel [wb-channel]]
```

## Syntax Description

|                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot/port</i>  <br><i>slot/subslot/port</i> | Identifies the cable interface on the Cisco uBR7225VXR, Cisco uBR7246VXR, or Cisco uBR10012 router. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router: The valid range is from 1 to 2.</li> <li>Cisco uBR7246VXR router: The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router: The valid range is from 5 to 8.</li> </ul> </li> <li><i>subslot</i>—Subslot where the line card resides. Available slots are 0 or 1. This option is available on the Cisco uBR10012 router.</li> <li><i>port</i>—Downstream port number on the line card. <ul style="list-style-type: none"> <li>Cisco uBR10012 router: The valid range is from 0 to 4.</li> <li>Cisco uBR7246VXR and Cisco uBR7225VXR routers: The valid port value is 0 or 1.</li> </ul> </li> </ul> |
| <b>all</b>                                     | (Optional) Displays the complete information about the line card statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>association</b>                             | (Optional) Displays the controller association information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>bpi-entry</b>                               | (Optional) Displays the controller Baseline Privacy Interface (BPI) information. <ul style="list-style-type: none"> <li><i>bpi-index</i>—BPI index number. The valid range is from 0 to 24575.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>brief</b>                                   | (Optional) Displays brief information about the line card statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>config</b>                                  | (Optional) Displays statistics about the JIB hardware and downstream PHY configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>counters</b>                                | (Optional) Displays information about the RF and wideband (WB) channel counters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>rf-channel</b>                              | Displays the RF channel information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>rf-channel</i>                              | (Optional) RF channel number. The valid range is from 0 to 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>wb-channel</b>                              | Displays the wideband channel information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>wb-channel</i>                              | (Optional) Wideband channel number. The valid range is from 0 to 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>errors</b>                                  | (Optional) Displays information about the error counters, such as DOCSIS processor error counters, BPI error counters, and queue manager error counters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>fpga_version</b>                            | (Optional) Displays the FPGA version information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>iofpga</b>                                  | (Optional) Displays the IOFPGA information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>mapping</b>                                 | (Optional) Displays mapping statistics of the RF and WB channels.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>registers</b>                               | (Optional) Displays the list of JIB hardware downstream register values.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|                         |                                                                 |
|-------------------------|-----------------------------------------------------------------|
| <b>status</b>           | (Optional) Displays the JIB hardware and downstream PHY status. |
| <b>wideband-channel</b> | (Optional) Displays the controller wideband cable information.  |

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                                                                            |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced.                                                                                                                                                                                                            |
|                 | 12.2(33)SCD | The command was modified. Added support for the Cisco uBR-MC88V line card on Cisco uBR7246VXR and Cisco uBR7225VXR universal broadband routers.                                                                                         |
|                 | 12.2(33)SCE | This command was modified. The following optional keywords were added: <ul style="list-style-type: none"> <li>• <b>fgpa_version</b></li> <li>• <b>iofpga</b></li> <li>• <b>rf-channel</b></li> <li>• <b>wideband-channel</b></li> </ul> |

**Usage Guidelines** This command allows the user to view the following line card statistics:

- Controller association
- JIB hardware downstream configuration
- Channel counters
- Errors
- Mapping of WB and RF channels
- JIB hardware downstream registers
- JIB hardware downstream status

**Examples** The following example shows a typical display of the **show controller integrated-cable** command and the **all** keyword:

```
Router# show controllers integrated-Cable 6/0/0 all
```

```
Integrated Cable Controller 6/0/0:
```

```

Channel 1 Annex = B Modulation = 256 QAM
Channel 2 Annex = B Modulation = 256 QAM
Channel 3 Annex = B Modulation = 256 QAM
Channel 4 Annex = B Modulation = 256 QAM
```

```
JIB3_DS BPI registers (base address 0xF8880000)
```

```
bpi_int_isr_0 [0x00000000] = 0x00000000
bpi_int_ier_0 [0x00000004] = 0x0000000F
glb_int_isr_0 [0x00000010] = 0x00000000
glb_int_ier_0 [0x00000014] = 0x000003FF
glb_int_isr_1 [0x00000020] = 0x00000000
```

## ■ show controller integrated-cable

```

glb_int_ier_1 [0x00000024] = 0x000003FF
bpi_int_fesr_0 [0x00000040] = 0x00000000
bpi_tst_tp_sel_reg [0x00000050] = 0x00000000
bpi_tst_tp_reg [0x00000054] = 0x00000000
bpi_cnt_good_packet_in_cnt [0x00000064] = 0x61308806
bpi_cnt_bad_packet_in_cnt [0x00000068] = 0x000006538
bpi_cnt_good_packet_out_cnt [0x0000006C] = 0x61308806
bpi_cnt_bad_packet_out_cnt [0x00000070] = 0x000006538
bpi_ecc_sbit_err_cnt [0x00000074] = 0x00000000
glb_sw_rev_id [0x00000078] = 0x00020002
glb_hw_rev_id [0x0000007C] = 0x00010008
frz_reg [0x00000080] = 0x00000000
frz_en [0x00000084] = 0x00000001
glb_dcm_status [0x00000088] = 0x00000007
glb_sw_rst [0x0000008C] = 0x00000000

```

JIB3\_DS ERP registers (base address 0xF8881000)

```

erp_irq_src_reg [0x00000000] = 0x00000000
erp_irq_en_reg [0x00000004] = 0x80000FFF
erp_tp_sel_reg [0x00000050] = 0x00000000
erp_tp_reg [0x00000054] = 0x00000000
erp_cfg_reg [0x00000060] = 0x00000000
erp_err_record_reg [0x00000064] = 0x00000000
erp_err_addr_record_reg [0x00000068] = 0x00000000
erp_err_wd_record_reg [0x0000006C] = 0x00000000
erp_proc_err_addr_record_reg [0x00000090] = 0x00000000

```

JIB3\_DS RX SPI registers (base address 0xF8882000)

```

rxspi_irq_src_reg [0x00000000] = 0x00000000
rxspi_irq_en_reg [0x00000004] = 0x000001FF
rxspi_ferr_src_reg [0x00000040] = 0x00000000
rxspi_testpoint_sel_reg [0x00000050] = 0x00000000
rxspi_testpoint_reg [0x00000054] = 0x00000000
rxspi_rst_cntl_reg [0x00000060] = 0x00000000
rxspi_cntl_status_reg [0x00000064] = 0x00000005
rxspi_cfg_cntl_reg [0x00000068] = 0x00000021
rxspi_afthres_reg [0x0000006C] = 0x01C00180
rxspi_cal_dur_reg [0x00000070] = 0x00030000
rxspi_non_drop_err_cnt_reg [0x00000088] = 0x00000000
rxspi_drop_byte_cnt_reg [0x0000008C] = 0x00000000
rxspi_rx_byte_cnt_reg[0] [0x000000B0] = 0xFFFFFFFF
rxspi_rx_byte_cnt_reg[1] [0x000000B4] = 0xFFFFFFFF
rxspi_rx_byte_cnt_reg[2] [0x000000B8] = 0x14B49467
rxspi_rx_pkt_cnt_reg[0] [0x000000C0] = 0x3FF2F36C
rxspi_rx_pkt_cnt_reg[1] [0x000000C4] = 0x20F3AFA9
rxspi_rx_pkt_cnt_reg[2] [0x000000C8] = 0x004A4A35
rxspi_fifo_pkt_drop_cnt_reg[0] [0x000000E0] = 0x00000000
rxspi_fifo_pkt_drop_cnt_reg[1] [0x000000E4] = 0x00000000
rxspi_fifo_pkt_drop_cnt_reg[2] [0x000000E8] = 0x00000000
rxspi_calendar_table_reg[0] [0x00000800] = 0x00000000
rxspi_calendar_table_reg[1] [0x00000804] = 0x00000001
rxspi_calendar_table_reg[2] [0x00000808] = 0x00000002
rxspi_calendar_table_reg[3] [0x0000080C] = 0x00000003

```

JIB3\_DS TX SPI registers (base address 0xF8883000)

```

txspi_irq_src_reg [0x00000000] = 0x00000000
txspi_irq_en_reg [0x00000004] = 0x0000001F
txspi_ferr_src_reg [0x00000040] = 0x00000000
txspi_testpoint_sel_reg [0x00000050] = 0x00000000
txspi_testpoint_reg [0x00000054] = 0x00000000
txspi_rst_cntl_reg [0x00000060] = 0x00000000

```

```

txspi_cntl_status_reg [0x00000064] = 0x00000009
txspi_cfg_cntl_reg [0x00000068] = 0x00000001
txspi_afthres_reg [0x0000006C] = 0x01EC01E8
txspi_cal_dur_reg [0x00000070] = 0x00040000
txspi_train_cntl_reg [0x00000074] = 0x00000000
txspi_nonfatalerr_cnt_reg [0x00000080] = 0x00000000
txspi_eop_abort_pkt_cnt_reg[0] [0x00000090] = 0x00000000
txspi_eop_abort_pkt_cnt_reg[1] [0x00000094] = 0x00000000
txspi_eop_abort_pkt_cnt_reg[2] [0x00000098] = 0x00000000
txspi_eop_abort_pkt_cnt_reg[3] [0x0000009C] = 0x00000000
txspi_eop_abort_byte_cnt_reg[0] [0x000000A0] = 0x00000000
txspi_eop_abort_byte_cnt_reg[1] [0x000000A4] = 0x00000000
txspi_eop_abort_byte_cnt_reg[2] [0x000000A8] = 0x00000000
txspi_eop_abort_byte_cnt_reg[3] [0x000000AC] = 0x00000000
txspi_tx_byte_cnt_reg[0] [0x000000C0] = 0x00000000
txspi_tx_byte_cnt_reg[1] [0x000000C4] = 0x00000000
txspi_tx_byte_cnt_reg[2] [0x000000C8] = 0x00000000
txspi_tx_byte_cnt_reg[3] [0x000000CC] = 0x00000000
txspi_tx_pkt_cnt_reg[0] [0x00000100] = 0x00000000
txspi_tx_pkt_cnt_reg[1] [0x00000104] = 0x00000000
txspi_tx_pkt_cnt_reg[2] [0x00000108] = 0x00000000
txspi_tx_pkt_cnt_reg[3] [0x0000010C] = 0x00000000
txspi_calendar_table_reg[0] [0x00000800] = 0x00000000
txspi_calendar_table_reg[1] [0x00000804] = 0x00000001
txspi_calendar_table_reg[2] [0x00000808] = 0x00000002
txspi_calendar_table_reg[3] [0x0000080C] = 0x00000003
txspi_calendar_table_reg[4] [0x00000810] = 0x00000004

```

JIB3\_DS DOC registers (base address 0xF8884000)

```

doc_int_err0 [0x00000000] = 0x00000000
doc_int_err0_ier [0x00000004] = 0xFFBFBFFD
doc_int_err1 [0x00000010] = 0x00000000
doc_int_err1_ier [0x00000014] = 0x003FFFF8
doc_int_fesr [0x00000040] = 0x00000000
doc_test_sel [0x00000050] = 0x00000000
doc_testpoint [0x00000054] = 0x00000000
doc_cfg_ctrl [0x00000060] = 0x031A0000
doc_err_cap_ctrl [0x00000064] = 0x001F0001
doc_err_cap_addr [0x00000068] = 0x00000000
doc_err_cap_data [0x0000006C] = 0x000080F7
doc_seg_num [0x00000070] = 0x00000001
doc_wb_chan_stats_sel [0x00000074] = 0x00000077
doc_wb_pkt_cnt [0x00000078] = 0x00000000
doc_wb_byte_cnt [0x0000007C] = 0x00000000
doc_wb_police_sel [0x00000080] = 0x00000000
doc_wb_police_data [0x00000084] = 0x00000000
doc_wb_police_intv [0x00000088] = 0x00000000
doc_nb_chan_stats_sel [0x0000008C] = 0x0000004C
doc_nb_pkt_cnt [0x00000090] = 0x00000000
doc_nb_byte_cnt [0x00000094] = 0x00000000
doc_nb_police_sel [0x00000098] = 0x00000000
doc_nb_police_data [0x0000009C] = 0x00000000
doc_nb_police_intv [0x000000A0] = 0x00000000
doc_int_doc_cnt [0x000000D4] = 0x00000000
doc_int_ecc_sbiter_cnt [0x000000D8] = 0x00000000
doc_pkt_good_in_cnt [0x000000DC] = 0x6130ED6F
doc_pkt_good_out_cnt [0x000000E0] = 0x61308837
doc_pkt_err_in_cnt [0x000000E4] = 0x00000000
doc_pkt_err_out_cnt [0x000000E8] = 0x00006538
doc_pkt_drop_cnt [0x000000EC] = 0x00000000
doc_efc_all_cnt [0x000000F0] = 0x00000000
doc_efc_hi_cnt [0x000000F4] = 0x00000000
doc_efc_me_cnt [0x000000F8] = 0x00000000

```

## ■ show controller integrated-cable

```

doc_efc_lo_cnt [0x000000FC] = 0x00000000
doc_efc_ch_sel [0x00000100] = 0x00000000
doc_efc_debug_ctrl [0x00000104] = 0x00000000
doc_rldram_ext_ecc [0x00000114] = 0x00000000
doc_rldram_cfg [0x00000118] = 0x00101544
doc_rldram_ctrl [0x0000011C] = 0x00100389
doc_rldram_status [0x00000120] = 0x039D7403
doc_rldram_blk_clr [0x00000124] = 0x0B7FFFFF
doc_rldram_cal_match_win_h [0x00000128] = 0x00000000
doc_rldram_cal_match_win_l [0x0000012C] = 0x1FFFFFFF
doc_rldram_ecc_err_rec_addr [0x00000130] = 0x00000000
doc_magic_num_err_pkt_ctrl [0x00000150] = 0x00000000
doc_magic_num_err_pkt_addr [0x00000154] = 0x00000000
doc_magic_num_err_pkt_data [0x00000158] = 0x00000000

```

JIB3\_DS RIF registers (base address 0xF8885000)

```

rif_int_err0 [0x00000000] = 0x00000000
rif_int_ier0 [0x00000004] = 0x00000007
rif_int_fesr0 [0x00000040] = 0x00000000
rif_tp_sel [0x00000050] = 0x00000000
rif_tp [0x00000054] = 0x00000000
rif_cfg_ctrl [0x00000060] = 0x00000000
rif_cnt_in_mpeg_cnt [0x00000064] = 0xFFFFFFFF
rif_cnt_out_good_mpeg_cnt [0x00000068] = 0xFFFFFFFF
rif_cnt_out_bad_mpeg_cnt [0x0000006C] = 0x00000000
rif_cnt_drop_mpeg_cnt [0x00000070] = 0x00000000
rif_lbit_ecc_err_stat [0x00000074] = 0x00000000

```

JIB3\_DS RTN registers (base address 0xF8886000)

```

return_int_isr [0x00000000] = 0x00000000
return_int_ier [0x00000004] = 0x000001FF
return_int_fesr [0x00000040] = 0x00000000
return_tp_sel [0x00000050] = 0x00000000
return_tp [0x00000054] = 0x00000000
return_ctrl_reg [0x00000060] = 0x00000000
return_pif_loopback_chnl [0x00000064] = 0x00000000
return_sniffer_nonbonded_en [0x00000068] = 0x00000000
return_sniffer_bonded_en [0x0000006C] = 0x00000000
return_spi_chnl_sel [0x00000070] = 0x0000013A
return_err_drop_en [0x00000074] = 0x0000000F
return_snf_macda_cfg_addr [0x00000078] = 0x00000000
return_snf_macda_cfg_data_hi [0x0000007C] = 0x00000000
return_snf_macda_cfg_data_lo [0x00000080] = 0x00000000
return_in_pifrx_good_cnt [0x000000A0] = 0x00000000
return_in_pifrx_bad_cnt [0x000000A4] = 0x00000000
return_in_piflp_good_cnt [0x000000A8] = 0xFFFFFFFF
return_in_piflp_bad_cnt [0x000000AC] = 0x00000000
return_in_sniffer_good_cnt [0x000000B0] = 0x61308845
return_in_sniffer_bad_cnt [0x000000B4] = 0x00006538
return_in_spi_loop_good_cnt [0x000000B8] = 0x00000000
return_in_spi_loop_bad_cnt [0x000000BC] = 0x00000000
return_out_spi0_cnt [0x000000C0] = 0x00000000
return_out_spi1_cnt [0x000000C4] = 0x00000000
return_out_spi2_cnt [0x000000C8] = 0x00000000
return_out_spi3_cnt [0x000000CC] = 0x00000000
return_out_spi4_cnt [0x000000D0] = 0x00000000
return_pifrx_if_par_err_drop_cnt [0x000000D4] = 0x00000000
return_pifrx_if_len_err_drop_cnt [0x000000D8] = 0x00000000
return_piflp_if_err_drop_cnt [0x000000DC] = 0x00000000
return_piflp_if_chnl_drop_cnt [0x000000E0] = 0x00000000
return_snf_pb_err_drop_cnt [0x000000E4] = 0x00006538
return_snf_pkt_type_err_drop_cnt [0x000000E8] = 0x61308845

```

```

return_spilp_if_err_drop_cnt [0x000000EC] = 0x00000000
return_pifrx_traffic_mux_drop_cnt [0x000000F0] = 0x00000000
return_piflp_traffic_mux_drop_cnt [0x000000F4] = 0x00000000
return_snf_traffic_mux_drop_cnt [0x000000F8] = 0x00000000
return_spilp_traffic_mux_drop_cnt [0x000000FC] = 0x00000000
return_pifrx_fifo_overflow_drop_cnt [0x00000100] = 0x00000000
return_piflp_fifo_overflow_drop_cnt [0x00000104] = 0x00000000
return_snf_fifo_overflow_drop_cnt [0x00000108] = 0x00000000
return_spilp_fifo_overflow_drop_cnt [0x0000010C] = 0x00000000
return_pifrx_if_par_err_cnt [0x00000110] = 0x00000000
return_pifrx_if_len_err_cnt [0x00000114] = 0x00000000
return_pifrx_fifo_ecc_1berr_cnt [0x00000118] = 0x00000000
return_piflp_fifo_ecc_1berr_cnt [0x0000011C] = 0x00000000
return_snf_fifo_ecc_1berr_cnt [0x00000120] = 0x00000000
return_spilp_fifo_ecc_1berr_cnt [0x00000124] = 0x00000000

```

JIB3\_DS DLM registers (base address 0xF8890000)

```

dlm_int_isr0 [0x00000000] = 0x00000005
dlm_int_ier0 [0x00000004] = 0x00000000
dlm_cnt_local_ts_reg [0x00000064] = 0x5B00EB07
dlm_cfg_tss_comp_reg [0x00000068] = 0x00000027
dlm_cfg_tss_ctrl_reg [0x0000006C] = 0x00000000
dlm_cfg_tss_cmd_reg [0x00000070] = 0x00000000
dlm_cnt_ts_load_cnt [0x000000BC] = 0x00000000
dlm_cnt_ts_chk_failed_cnt [0x000000C4] = 0x00000000
dlm_cnt_tss_perr_cnt [0x000000C8] = 0x00000000
dlm_cnt_load_ts_reg [0x000000D0] = 0x003F52EF

```

JIB3\_DS SEQ registers (base address 0xF8892000)

```

seq_int_err0 [0x00000000] = 0x0000000F
seq_int_ier0 [0x00000004] = 0x000FFFFF
seq_int_err3 [0x00000030] = 0x00000000
seq_int_ier3 [0x00000034] = 0x00000001
seq_int_fatal_err [0x00000040] = 0x00000000
seq_tp_sel [0x00000050] = 0x00000000
seq_tp [0x00000054] = 0x00000000
seq_cfg_en [0x00000060] = 0x00000001
seq_cfg_sync_timer_sel [0x00000064] = 0x00000004
seq_cfg_sync_timer_data [0x00000068] = 0x00000000
seq_cfg_sync_sa_sel [0x0000006C] = 0x00000004
seq_cfg_sync_sa_data_lo [0x00000070] = 0x70CC0B91
seq_cfg_sync_sa_data_hi [0x00000074] = 0x00000000
seq_cfg_tkb_timer_sel [0x00000078] = 0x00000014
seq_cfg_tkb_timer_data [0x0000007C] = 0x00000000
seq_cfg_tkb_max [0x00000080] = 0x00000000
seq_hwdbg_dpv_proc_table_addr [0x00000090] = 0x00000000
seq_hwdbg_dpv_ptr_mod_table [0x00000094] = 0x00000000
seq_hwdbg_dpv_timestamp_table [0x00000098] = 0x00000000
seq_hwdbg_dpv_hcs_table [0x0000009C] = 0x00000000
seq_cnt_blkram_oecc_err_stat [0x000000A4] = 0x00000000
seq_cnt_tran_mpeg_stat [0x000000A8] = 0xFFFFFFFF
seq_cnt_tran_mpeg_sync_stat [0x000000AC] = 0x00000000
seq_cnt_tran_only_sync_stat [0x000000B0] = 0x00000000
seq_cnt_tran_dpv_stat [0x000000B8] = 0x00000000

```

JIB3\_DS QM registers (base address 0xF8893000)

```

qm_int_isr0 [0x00000000] = 0x00000000
qm_int_ier0 [0x00000004] = 0x0000007F
qm_int_isr1 [0x00000010] = 0x00000000
qm_int_ier1 [0x00000014] = 0x000FFFFF
qm_int_fat_err_isr [0x00000040] = 0x00000000

```

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|                                  |                            |
|----------------------------------|----------------------------|
| qm_tst_tp_sel                    | [0x00000050] = 0x00000000  |
| qm_tst_tp                        | [0x00000054] = 0x00000000  |
| qm_cfg_chnl_rst_0                | [0x00000060] = 0x00000000  |
| qm_cfg_ctl                       | [0x0000006C] = 0x00000011  |
| qm_cfg_sqf_fac_addr              | [0x0000008C] = 0x00000014  |
| qm_cfg_sqf_fac_data              | [0x00000090] = 0x00000000  |
| qm_cfg_bond_chnl_map_addr        | [0x00000094] = 0x00000020  |
| qm_cfg_bond_chnl_map_data_lo     | [0x00000098] = 0x00000000  |
| qm_cfgflt_thr_addr               | [0x000000A4] = 0x0000024F  |
| qm_cfgflt_thr_data               | [0x000000A8] = 0x00000000  |
| qm_cfg_repl_addr                 | [0x000000AC] = 0x0000002D  |
| qm_cfg_repl_data_lo              | [0x000000B0] = 0x00000000  |
| qm_hwdbg_buf_mag_addr            | [0x000000BC] = 0x00000000  |
| qm_hwdbg_wptr_data_lo            | [0x000000C0] = 0x000000C60 |
| qm_hwdbg_wptr_data_mi            | [0x000000C4] = 0x00016080  |
| qm_hwdbg_wptr_data_hi            | [0x000000C8] = 0x000012A0  |
| qm_hwdbg_rptr_data_lo            | [0x000000CC] = 0x000000C60 |
| qm_hwdbg_rptr_data_mi            | [0x000000D0] = 0x00016080  |
| qm_hwdbg_rptr_data_hi            | [0x000000D4] = 0x000012A0  |
| qm_hwdbg_qulen_data_lo           | [0x000000D8] = 0x00000000  |
| qm_hwdbg_qulen_data_mi           | [0x000000DC] = 0x00000000  |
| qm_hwdbg_qulen_data_hi           | [0x000000E0] = 0x00000000  |
| qm_hwdbg contex_data             | [0x000000E4] = 0x00000000  |
| qm_cfg_dir_stat_addr             | [0x000000E8] = 0x0000004E  |
| qm_cnt_dir_pkt_stat              | [0x000000EC] = 0x00000000  |
| qm_cnt_dir_byte_stat             | [0x000000F0] = 0x00000000  |
| qm_cfg_qam_stat_addr             | [0x000000F4] = 0x0000004C  |
| qm_cnt_qam_chnl_pkt_stat         | [0x000000F8] = 0x00000000  |
| qm_cnt_qam_chnl_byte_stat        | [0x000000FC] = 0x00000000  |
| qm_cnt_qam_chnl_sync_stat        | [0x00000100] = 0x00000000  |
| qm_cnt_bpram_ovrflw_stat         | [0x00000108] = 0x00000000  |
| qm_cnt_que_ovrflw_stat           | [0x0000010C] = 0x00000000  |
| qm_cnt_good_bpi_pkt_stat         | [0x00000110] = 0x6130886C  |
| qm_cnt_bad_bpi_pkt_stat          | [0x00000114] = 0x000000FF  |
| qm_cnt_bpram_out_good_pkt_stat   | [0x0000011C] = 0xC38C8639  |
| qm_cnt_bpram_out_dir_pkt_stat    | [0x00000120] = 0x213DFA0E  |
| qm_cnt_bpram_out_bonded_pkt_stat | [0x00000124] = 0x3486CDA6  |
| qm_cnt_replicated_pkt_stat       | [0x00000128] = 0x8399F7DB  |
| qm_cnt_bpram_bad_type_pkt_stat   | [0x00000134] = 0x00000000  |
| qm_cnt_bpram_bad_eop_pkt_stat    | [0x00000138] = 0x00000000  |
| qm_cnt_bpram_bad_dir_pkt_stat    | [0x0000013C] = 0x00000000  |
| qm_cnt_bpram_bad_bonded_pkt_stat | [0x00000140] = 0x00000000  |
| qm_cnt_bpram_oecc_err_pkt_stat   | [0x00000144] = 0x00000000  |
| qm_cnt_bpram_bad_pkt_stat        | [0x00000148] = 0x000000FF  |
| qm_cnt_wr_good_pkt_stat          | [0x0000014C] = 0xC38C863A  |
| qm_cnt_wr_bad_pkt_stat           | [0x00000150] = 0x00000000  |
| qm_cnt_drop_bad_pkt_stat         | [0x00000154] = 0x000000FF  |
| qm_cnt_drop_ovrflw_pkt_stat      | [0x00000158] = 0x00000000  |
| qm_cnt_rd_pkt_stat               | [0x0000015C] = 0xC38C8664  |
| qm_cnt_rd_mpeg_stat              | [0x00000160] = 0xFFFFFFFF  |
| qm_cnt_rd_mpeg_sync_stat         | [0x00000164] = 0x06A0FC65  |
| qm_cnt_rd_mpeg_only_sync_stat    | [0x00000168] = 0x0620376C  |
| qm_cnt_tran_pkt_stat             | [0x00000170] = 0xC38C8664  |
| qm_cnt_tran_oecc_err_pkt_stat    | [0x00000174] = 0x00000000  |
| qm_cnt_tran_mpeg_stat            | [0x00000178] = 0xFFFFFFFF  |
| qm_cnt_tran_mpeg_sync_stat       | [0x0000017C] = 0x06A0FC65  |
| qm_cnt_tran_mpeg_only_sync_stat  | [0x00000180] = 0x0620376C  |
| qm_cnt_tran_dpv_stat             | [0x00000188] = 0x00000000  |
| qm_rldram_ext_ecc                | [0x00000198] = 0x00000000  |
| qm_rldram_cfg                    | [0x0000019C] = 0x00101544  |
| qm_rldram_ctrl                   | [0x000001A0] = 0x00100389  |
| qm_rldram_status                 | [0x000001A4] = 0x03DF7C03  |
| qm_rldram_cal_match_win_h        | [0x000001A8] = 0x00000000  |
| qm_rldram_cal_match_win_l        | [0x000001AC] = 0x7FFFFFFF  |



JIB3\_DS PG registers (base address 0xF8898000)

|                   |              |              |
|-------------------|--------------|--------------|
| pg_mod            | [0x00000050] | = 0x00000000 |
| pg_dhs            | [0x00000054] | = 0x00000000 |
| pg_ipg            | [0x0000005C] | = 0x00000000 |
| pg_num            | [0x00000058] | = 0x00000000 |
| pg_payload_length | [0x00000060] | = 0x00000000 |
| pg_payload_value  | [0x00000064] | = 0x00000000 |
| pg_pkt_hdr_prog_0 | [0x00000068] | = 0x00000000 |
| pg_pkt_hdr_prog_1 | [0x0000006C] | = 0x00000000 |
| pg_pkt_hdr_1      | [0x00000070] | = 0x00000000 |
| pg_pkt_hdr_2      | [0x00000074] | = 0x00000000 |
| pg_pkt_hdr_3      | [0x00000078] | = 0x00000000 |
| pg_pkt_hdr_4      | [0x0000007C] | = 0x00000000 |
| pg_pkt_hdr_5      | [0x00000080] | = 0x00000000 |
| pg_pkt_hdr_6      | [0x00000084] | = 0x00000000 |

JIB3\_DS PMBIST registers (base address 0xF8899000)

|                          |              |              |
|--------------------------|--------------|--------------|
| pmbist_ena_addr          | [0x00000060] | = 0x00000002 |
| pmbist_din_addr          | [0x00000064] | = 0x00000000 |
| pmbist_dout_addr         | [0x0000006C] | = 0x00008101 |
| pmbist_trgt_select_addr  | [0x00000074] | = 0x00000000 |
| pmbist_ff_status         | [0x00000078] | = 0x00000000 |
| pmbist_num_wr_fr_pmbist  | [0x0000007C] | = 0x00000000 |
| pmbist_num_rd_fr_pmbist  | [0x00000080] | = 0x00000000 |
| pmbist_um_wr_2cmd_ff     | [0x00000084] | = 0x00000000 |
| pmbist_num_rd_2cmd_ff    | [0x00000088] | = 0x00000000 |
| pmbist_num_rd_rtn_pmbist | [0x0000008C] | = 0x00000000 |
| pmbist_num_wr_2dram      | [0x00000090] | = 0x00000000 |
| pmbist_num_rd_2dram      | [0x00000094] | = 0x00000000 |
| pmbist_num_rd_fr_dram    | [0x00000098] | = 0x00000000 |

DS PHY Configuration of Controller 0:

-----  
 Base Frequency = 555000000Hz  
 RF-Power = 52.0dBmV  
 Annex = B Modulation = 256QAM  
 Channel Status Interleave

-----  

|   |        |    |
|---|--------|----|
| 0 | Active | 32 |
| 1 | Active | 32 |
| 2 | Active | 32 |
| 3 | Active | 32 |

DS\_PHY PLL set for Annex-B

DS PHY Device Information:

-----  
 Remora Version = 3.10  
 UPX SW Version = 0x10D  
 Upconverter Type:Unknown  
 UPX Part Number =

Device Status:

-----  
 UPX Alarm Status = 0x3FF  
 UPX Alarm Mask = 0x19000

Remora registers (base address 0xF8900000)

-----  
 Remora General Registers (0xF8900000):  
 -----

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```

revision [0x00000000] = 0x00000003
hw_fpga_rev_id [0x00000004] = 0x0000000A
erp_scratch_pad0 [0x00000008] = 0x00000000
erp_scratch_pad1 [0x0000000C] = 0x00000000

```

## Remora Reset and DCM Lock Registers (0xF8900100):

```

reset_ctrl [0x00000100] = 0x00000000
dcm_lock [0x00000104] = 0x0000000F

```

## Remora Configuration Registers (0xF8900200):

```

port_cfg[0] [0x00000200] = 0x00155549
port_cfg[1] [0x00000204] = 0x00155548
port_cfg[2] [0x00000208] = 0x00155548
port_cfg[3] [0x0000020C] = 0x00155548
port_cfg[4] [0x00000210] = 0x00155548
core_config_status [0x00000214] = 0x00000020
port_rm2tififo_prog_flags[0] [0x00000218] = 0xBBA20C0D
port_rm2tififo_prog_flags[1] [0x0000021C] = 0xBBA20C0D
port_rm2tififo_prog_flags[2] [0x00000220] = 0xBBA20C0D
port_rm2tififo_prog_flags[3] [0x00000224] = 0xBBA20C0D
port_rm2tififo_prog_flags[4] [0x00000228] = 0xBBA20C0D

```

## Remora DFT/Pattern Inject Registers (0xF8900300):

```

alt_sym_tst_mode [0x00000300] = 0x00005A69
alt_sym_tst_en_reg [0x00000304] = 0x00000000
qdr_mem_test_en_reg [0x00000308] = 0x00000000
qdr_mem_test_rd_wr_reg [0x0000030C] = 0x00000A12
ready_for_data_input [0x00000318] = 0x0000001F

```

## Remora ECC Registers (0xF8900400):

```

debug_cfg [0x00000400] = 0x00000000
sniff_frame_cnt [0x00000404] = 0x00000000
ecc_parity_conf_reg [0x00000408] = 0x00000003
ecc_uncorrect_data_log_reg [0x0000040C] = 0x00002814
ecc_uncorrect_log_reg [0x00000410] = 0x00000020
ecc_correctable_data_log_reg [0x00000414] = 0x00002C14
ecc_correctable_log_reg [0x00000418] = 0x00000028
qdr_ecc_corr_cnt_reg [0x0000041C] = 0x00000000
fatal_err_log [0x00000420] = 0x00000000
err_inj_reg [0x00000424] = 0x00000000

```

## Remora QDR Registers (0xF8900500):

```

qdr_phy_idelayctrl_rst_reg [0x00000500] = 0x00000000
qdr_phy_idelayctrl_rdy_err_reg [0x00000504] = 0x00000261
qdr_phy_cal_tap_dly_reg [0x00000508] = 0x00000ADB
qdr_phy_idelayctrl_ctrl_reg [0x0000050C] = 0x00000002
qdr_init_ctrl_reg [0x00000510] = 0x801FFFFF

```

## Remora Interrupt Status Registers (0xF8900600):

```

glb_int_stat_reg [0x00000600] = 0x00000000
int_stat_gr_reg[0] [0x00000604] = 0x00000000
int_stat_gr_reg[1] [0x00000608] = 0x00000000
int_stat_gr_reg[2] [0x0000060C] = 0x00000000
int_stat_gr_reg[3] [0x00000610] = 0x00000000
int_stat_gr_reg[4] [0x00000614] = 0x00000000
misc_int_stat_reg [0x00000618] = 0x00000001
fatal_err_src_reg [0x0000061C] = 0x00000000
port_local_interrupt_enable[0] [0x00000620] = 0x0001FFFF

```

```

port_local_interrupt_enable[1] [0x00000624] = 0x0001FFFF
port_local_interrupt_enable[2] [0x00000628] = 0x0001FFFF
port_local_interrupt_enable[3] [0x0000062C] = 0x0001FFFF
port_local_interrupt_enable[4] [0x00000630] = 0x0001FFFF
misc_int_en_reg [0x00000634] = 0x00001FF8
fatal_err_en_reg [0x00000638] = 0x00000EFF
port_local_interrupt_override[0] [0x0000063C] = 0x00000000
port_local_interrupt_override[1] [0x00000640] = 0x00000000
port_local_interrupt_override[2] [0x00000644] = 0x00000000
port_local_interrupt_override[3] [0x00000648] = 0x00000000
port_local_interrupt_override[4] [0x0000064C] = 0x00000000
misc_int_override [0x00000650] = 0x00000000
fatal_err_override [0x00000654] = 0x00000000

```

#### Remora Counts Registers (0xF8900800):

```

illegal_ch_num_pkt_drop_count [0x00000800] = 0x00000000
fifo_full_mpeg_pkt_drop_count_hi [0x00000804] = 0x00000000
fifo_full_mpeg_pkt_drop_count_lo [0x00000808] = 0x00000000
channel_mpeg_pkt_count[0] [0x0000080C] = 0x00000EE7
channel_mpeg_pkt_count[1] [0x00000810] = 0x00000E8C
channel_mpeg_pkt_count[2] [0x00000814] = 0x00000839
channel_mpeg_pkt_count[3] [0x00000818] = 0x000009DF
channel_mpeg_pkt_count[4] [0x0000081C] = 0x00000000
channel_mpeg_pkt_count[5] [0x00000820] = 0x00000000
channel_mpeg_pkt_count[6] [0x00000824] = 0x00000000
channel_mpeg_pkt_count[7] [0x00000828] = 0x00000000
channel_mpeg_pkt_count[8] [0x0000082C] = 0x00000000
channel_mpeg_pkt_count[9] [0x00000830] = 0x00000000
channel_mpeg_pkt_count[10] [0x00000834] = 0x00000000
channel_mpeg_pkt_count[11] [0x00000838] = 0x00000000
channel_mpeg_pkt_count[12] [0x0000083C] = 0x00000000
channel_mpeg_pkt_count[13] [0x00000840] = 0x00000000
channel_mpeg_pkt_count[14] [0x00000844] = 0x00000000
channel_mpeg_pkt_count[15] [0x00000848] = 0x00000000
channel_mpeg_pkt_count[16] [0x0000084C] = 0x00000000
channel_mpeg_pkt_count[17] [0x00000850] = 0x00000000
channel_mpeg_pkt_count[18] [0x00000854] = 0x00000000
channel_mpeg_pkt_count[19] [0x00000858] = 0x00000000
port_re_timestamp_count[0] [0x0000085C] = 0x97979796
port_re_timestamp_count[1] [0x00000860] = 0x00000000
port_re_timestamp_count[2] [0x00000864] = 0x00000000
port_re_timestamp_count[3] [0x00000868] = 0x00000000
port_re_timestamp_count[4] [0x0000086C] = 0x00000000
port_rx_fifo_overflow_drop_count [0x00000870] = 0x00000000
port_rx_fifo_overflow_drop_count [1] [0x00000874] = 0x00000000
port_rx_fifo_overflow_drop_count [2] [0x00000878] = 0x00000000
port_rx_fifo_overflow_drop_count [3] [0x0000087C] = 0x00000000
port_rx_fifo_overflow_drop_count [4] [0x00000880] = 0x00000000
channel_jib_if_pkt_count[0] [0x00000884] = 0x4AFC8612
channel_jib_if_pkt_count[1] [0x00000888] = 0x44C96772
channel_jib_if_pkt_count[2] [0x0000088C] = 0x42A048EA
channel_jib_if_pkt_count[3] [0x00000890] = 0x43E61FF6
channel_jib_if_pkt_count[4] [0x00000894] = 0x00000000
channel_jib_if_pkt_count[5] [0x00000898] = 0x00000000
channel_jib_if_pkt_count[6] [0x0000089C] = 0x00000000
channel_jib_if_pkt_count[7] [0x000008A0] = 0x00000000
channel_jib_if_pkt_count[8] [0x000008A4] = 0x00000000
channel_jib_if_pkt_count[9] [0x000008A8] = 0x00000000
channel_jib_if_pkt_count[10] [0x000008AC] = 0x00000000
channel_jib_if_pkt_count[11] [0x000008B0] = 0x00000000
channel_jib_if_pkt_count[12] [0x000008B4] = 0x00000000
channel_jib_if_pkt_count[13] [0x000008B8] = 0x00000000
channel_jib_if_pkt_count[14] [0x000008BC] = 0x00000000

```

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```

channel_jib_if_pkt_count[15] [0x000008C0] = 0x00000000
channel_jib_if_pkt_count[16] [0x000008C4] = 0x00000000
channel_jib_if_pkt_count[17] [0x000008C8] = 0x00000000
channel_jib_if_pkt_count[18] [0x000008CC] = 0x00000000
channel_jib_if_pkt_count[19] [0x000008D0] = 0x00000000

```

## Remora Timestamp Registers (0xF8900900):

```

local_1024_ts_ctrl [0x00000900] = 0x00000039
local_1024_current_ts [0x00000904] = 0xC354FFA0
local_1024_tcc_ts_latch [0x00000908] = 0x7291125F
doc_ts_offset_ch_0_1 [0x0000090C] = 0x04AF04AF
doc_ts_offset_ch_2_3 [0x00000910] = 0x04AF04AF
doc_ts_offset_ch_4_5 [0x00000914] = 0x04F704F7
doc_ts_offset_ch_6_7 [0x00000918] = 0x04F704F7
doc_ts_offset_ch_8_9 [0x0000091C] = 0x04F704F7
doc_ts_offset_ch_10_11 [0x00000920] = 0x04F704F7
doc_ts_offset_ch_12_13 [0x00000924] = 0x04F704F7
doc_ts_offset_ch_14_15 [0x00000928] = 0x04F704F7
doc_ts_offset_ch_16_17 [0x0000092C] = 0x04F704F7
doc_ts_offset_ch_18_19 [0x00000930] = 0x04F704F7

```

## Remora PRATE/SRATE Registers (0xF8900A00):

```

port_prate_regs[0].prate_ctrl [0x00000A00] = 0x00000003
port_prate_regs[0].prate_m_prime_lo [0x00000A04] = 0x0005971E
port_prate_regs[0].prate_n_prime_lo [0x00000A08] = 0x08AA5B88
port_prate_regs[0].prate_m_prime_hi [0x00000A0C] = 0x00000000
port_prate_regs[1].prate_ctrl [0x00000A10] = 0x00000003
port_prate_regs[1].prate_m_prime_lo [0x00000A14] = 0x00000191
port_prate_regs[1].prate_n_prime_lo [0x00000A18] = 0x00037E78
port_prate_regs[1].prate_m_prime_hi [0x00000A1C] = 0x00000000
port_prate_regs[2].prate_ctrl [0x00000A20] = 0x00000003
port_prate_regs[2].prate_m_prime_lo [0x00000A24] = 0x00000191
port_prate_regs[2].prate_n_prime_lo [0x00000A28] = 0x00037E78
port_prate_regs[2].prate_m_prime_hi [0x00000A2C] = 0x00000000
port_prate_regs[3].prate_ctrl [0x00000A30] = 0x00000003
port_prate_regs[3].prate_m_prime_lo [0x00000A34] = 0x00000191
port_prate_regs[3].prate_n_prime_lo [0x00000A38] = 0x00037E78
port_prate_regs[3].prate_m_prime_hi [0x00000A3C] = 0x00000000
port_prate_regs[4].prate_ctrl [0x00000A40] = 0x00000003
port_prate_regs[4].prate_m_prime_lo [0x00000A44] = 0x00000191
port_prate_regs[4].prate_n_prime_lo [0x00000A48] = 0x00037E78
port_prate_regs[4].prate_m_prime_hi [0x00000A4C] = 0x00000000
port_srate_regs[0].srate_ctrl [0x00000A50] = 0x00000003
port_srate_regs[0].srate_mn [0x00000A54] = 0x004E0095
port_srate_regs[1].srate_ctrl [0x00000A58] = 0x00000003
port_srate_regs[1].srate_mn [0x00000A5C] = 0x0191032C
port_srate_regs[2].srate_ctrl [0x00000A60] = 0x00000003
port_srate_regs[2].srate_mn [0x00000A64] = 0x0191032C
port_srate_regs[3].srate_ctrl [0x00000A68] = 0x00000003
port_srate_regs[3].srate_mn [0x00000A6C] = 0x0191032C
port_srate_regs[4].srate_ctrl [0x00000A70] = 0x00000003
port_srate_regs[4].srate_mn [0x00000A74] = 0x0191032C

```

The following example shows a typical display of the **show controller integrated-cable** command and the **association** keyword:

Router# **show controller integrated-Cable 7/1/0 association**

```

WB Association Info for 7/1 No of WB 30
WB BG Bundle NB NB chan Reserved Total
channel ID num channel ID CIR CIR
Wideband-Cable7/1/0:0 1057 1 Cable7/1/0 121 0 21751500

```

|                       |        |                |   |          |
|-----------------------|--------|----------------|---|----------|
|                       |        | Multicast      | 0 | 21751500 |
| Wideband-Cable7/1/3:0 | 1153 1 | Cable7/1/3 133 | 0 | 12481000 |
|                       |        | Multicast      | 0 | 12481000 |

The following example shows a typical display of the **show controller integrated-cable** command and the **brief** keyword:

```
Router# show controllers integrated-cable 6/0/0 brief
```

```
Integrated Cable Controller 6/0/0:

Channel 1 Annex = B Modulation = 256 QAM
Channel 2 Annex = B Modulation = 256 QAM
Channel 3 Annex = B Modulation = 256 QAM
Channel 4 Annex = B Modulation = 256 QAM

Jib3-DS Device Information:

Jib3-DS Version = 2.2.1.8
SW Rev ID = 0x00020002 HW Rev ID = 0x00010008
Device Type: Coldplay
Driver State: 3

Channel Resources:

Total Non-bonded Channels.....= 20
Per-Controller Non-bonded Channels = 4
Total Bonded Channels.....= 32
Per-Controller Bonded Channels.....= 6

Slot-Wide Resources:

Number of PHS Rules.....= 12K (0x3000)
Number of BPI Table Entries...= 24K (0x6000)
Number of Service Flows.....= 64K (0x10000)

DS PHY Device Information:

Remora Version = 3.10
UPX SW Version = 0x10D
Upconverter Type:Unknown
UPX Part Number =

Device Status:

UPX Alarm Status = 0x3FF
UPX Alarm Mask = 0x19000
```

The following example shows a typical display of the **show controller integrated-cable** command and the **bpi-entry** keyword:

```
Router# show controller integrated-cable 7/1/4 bpi-entry 3
```

```
BPI index:3 segment:0 key_no:3 said:2 key_seq:7 AES
Even 5A4B-68E8-5948-FD84-F5E2-1D28-311C-37D8
Iv 4E33-379E-6FCF-9A8E-01CB-AC95-5B4D-AE76
Odd A871-76EA-1D3E-02F8-5EDA-8A8E-1F15-52E6
Iv 6F62-765C-C9E7-DB8A-6FA5-91E8-BE41-3075
```

**Example of the show controller integrated-cable Command that displays BPI key information stored on the Cisco UBR-MC20X20V line card from Cisco IOS Release 12.2(33)SCD onwards.**

The following is a sample output of the **show controller integrated-cable** command with the **bpi-entry** keyword:

```
Router# show controller integrated-cable 6/0/0 bpi-entry 1
```

```
BPI Index: 1 Segment: 0
Even Key: Valid, Odd Key: Valid
Key Sequence Number: 1 Security Association: 0x2
Key Type: DES
Even Key: 1CE8-45A1-1903-E5 IV: 1513-236D-1FF7-046E
Odd Key: 10EC-6DB2-5441-EC IV: 07C7-1089-0E34-026B
```

The following example provides information about all controllers using the **show controller integrated-cable** command and the **wideband** keyword:

```
Router# show controller integrated-cable 7/1/4 wideband
```

| WB<br>channel         | BG<br>ID | WB Host<br>Slot/Subslot | Primary<br>BG |
|-----------------------|----------|-------------------------|---------------|
| Wideband-Cable7/1/4:0 | 1185     | 7/1                     | Yes           |
| Wideband-Cable7/1/4:1 | 1186     | 7/1                     | Yes           |
| Wideband-Cable7/1/4:2 | 1187     | 7/1                     | Yes           |
| Wideband-Cable7/1/4:3 | 1188     | 7/1                     | Yes           |
| Wideband-Cable7/1/4:4 | 1189     | 7/1                     | Yes           |
| Wideband-Cable7/1/4:5 | 1190     | 7/1                     | Yes           |

The following example provides information about all controllers using the **show controller integrated-cable** command and the **config** keyword:

```
Router# show controllers integrated-Cable 6/0/0 config
```

```
Integrated Cable Controller 6/0/0:
```

```

Channel 1 Annex = B Modulation = 256 QAM
Channel 2 Annex = B Modulation = 256 QAM
Channel 3 Annex = B Modulation = 256 QAM
Channel 4 Annex = B Modulation = 256 QAM
```

```
Jib3-DS Device Information:
```

```

Jib3-DS Version = 2.2.1.8
SW Rev ID = 0x00020002 HW Rev ID = 0x00010008
Device Type: Coldplay
Driver State: 3
```

```
Channel Resources:
```

```

Total Non-bonded Channels.....= 20
Per-Controller Non-bonded Channels = 4
Total Bonded Channels.....= 32
Per-Controller Bonded Channels.....= 6
```

```
Slot-Wide Resources:
```

```

Number of PHS Rules.....= 12K (0x3000)
Number of BPI Table Entries...= 24K (0x6000)
Number of Service Flows.....= 64K (0x10000)
```

```
Sniffer Configuration:
```

```

Non-Bonded Channel Mask = 0x00000000
Bonded Channel Mask.....= 0x00000000
Sniff All Enable.....= False

```

#### Configured Sniffer MAC Addresses:

| Entry | MAC Address    | Enabled |
|-------|----------------|---------|
| 0     | 0000.0000.0000 | False   |
| 1     | 0000.0000.0000 | False   |
| 2     | 0000.0000.0000 | False   |
| 3     | 0000.0000.0000 | False   |
| 4     | 0000.0000.0000 | False   |
| 5     | 0000.0000.0000 | False   |
| 6     | 0000.0000.0000 | False   |
| 7     | 0000.0000.0000 | False   |
| 8     | 0000.0000.0000 | False   |
| 9     | 0000.0000.0000 | False   |
| 10    | 0000.0000.0000 | False   |
| 11    | 0000.0000.0000 | False   |
| 12    | 0000.0000.0000 | False   |
| 13    | 0000.0000.0000 | False   |
| 14    | 0000.0000.0000 | False   |
| 15    | 0000.0000.0000 | False   |

#### Replication Table:

| Replication Entry Index | Channel Mask |
|-------------------------|--------------|
| 41                      | 0x0000000F   |
| 42                      | 0x0000000F   |
| 43                      | 0x0000000F   |
| 44                      | 0x0000000F   |

#### Configured Bonding Groups:

| Bonded Channel | Channels in Bonding Group |
|----------------|---------------------------|
| 00             | 0, 1, 2, 3                |

#### Sync Configuration:

| Channel | MAC Address    | Interval |
|---------|----------------|----------|
| 0       | 001d.70cc.0b90 | 10 ms    |
| 1       | 001d.70cc.0b90 | 10 ms    |
| 2       | 001d.70cc.0b90 | 10 ms    |
| 3       | 001d.70cc.0b90 | 10 ms    |

#### DS PHY Configuration of Controller 0:

```

Base Frequency = 555000000Hz
RF-Power = 52.0dBmV
Annex = B Modulation = 256QAM
Channel Status Interleave

0 Active 32
1 Active 32

```

## ■ show controller integrated-cable

```

 2 Active 32
 3 Active 32
DS_PHY PLL set for Annex-B

```

The following example provides information about all controllers using the **show controller integrated-cable** command and the **counters** keyword:

Router# **show controller integrated-Cable card 7/1 counters rf-channel**

| Controller<br>Chan | RF<br>Packets | MPEG<br>bps | MPEG<br>Mbps | MPEG<br>Packets | Sync<br>Packets | MAP/UCD   |
|--------------------|---------------|-------------|--------------|-----------------|-----------------|-----------|
|                    |               | Tx          |              |                 | Tx              |           |
| 7/1/0              | 0             | 510617849   | 1411052      | 1.411052        | 45424209        | 894786143 |
| 7/1/0              | 1             | 511430476   | 1415614      | 1.415614        | 45424208        | 894786138 |
| 7/1/0              | 2             | 510750271   | 1412707      | 1.412707        | 45424208        | 894786121 |
| 7/1/0              | 3             | 512009268   | 1416818      | 1.416818        | 45424207        | 894786108 |
| 7/1/1              | 0             | 268915155   | 743427       | 0.74347         | 45424206        | 223046013 |
| 7/1/1              | 1             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/1              | 2             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/1              | 3             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/2              | 0             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/2              | 1             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/2              | 2             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/2              | 3             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/3              | 0             | 269847377   | 746886       | 0.746886        | 45424206        | 223769698 |
| 7/1/3              | 1             | 269850587   | 746936       | 0.746936        | 45424205        | 223769696 |
| 7/1/3              | 2             | 269851105   | 746886       | 0.746886        | 45424204        | 223769690 |
| 7/1/3              | 3             | 269868256   | 747036       | 0.747036        | 45424199        | 223769663 |
| 7/1/4              | 0             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/4              | 1             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/4              | 2             | 0           | 0            | 0.0             | 0               | 0         |
| 7/1/4              | 3             | 0           | 0            | 0.0             | 0               | 0         |

Router# **show controllers integrated-Cable 6/0/0 counters wb-channel**

| Controller | WB channel | Tx packets | Tx octets    |
|------------|------------|------------|--------------|
| 6/0/0      | 0          | 881249714  | 466143984373 |
| 6/0/0      | 1          | 0          | 0            |
| 6/0/0      | 2          | 0          | 0            |
| 6/0/0      | 3          | 0          | 0            |
| 6/0/0      | 4          | 0          | 0            |
| 6/0/0      | 5          | 0          | 0            |

The following example provides information about all controllers using the **show controller integrated-cable** command and the **errors** keyword:

Router# **show controllers integrated-Cable 6/0/0 errors**

Rx SPI Error Counters:

-----

```

Non-Droppable Errors Channel 0 = 00 FIFO Pkt Drop Count Channel 0 = 00000000
Non-Droppable Errors Channel 1 = 00 FIFO Pkt Drop Count Channel 1 = 00000000
Non-Droppable Errors Channel 2 = 00 FIFO Pkt Drop Count Channel 2 = 00000000
Non-Droppable Errors Channel 3 = 00 Dropped Bytes = 00000000

```

Tx SPI Error Counters:

-----

```

DIP2 Errors = 00 Illegal Src Pattern Errs = 00
EOP Abort Pkts Channel 0 = 00000000 EOP Abort Bytes Channel 0 = 00000000
EOP Abort Pkts Channel 1 = 00000000 EOP Abort Bytes Channel 1 = 00000000
EOP Abort Pkts Channel 2 = 00000000 EOP Abort Bytes Channel 2 = 00000000
EOP Abort Pkts Channel 3 = 00000000 EOP Abort Bytes Channel 3 = 00000000

```



## DOCSIS Processor Error Counters:

```

EFC and Stats Errors = 00000000 DOCSIS Engine Errors = 00025934
PHS Errors = 00000000 Parser Errors = 00000000
Output Packet Errors = 00000000 Dropped Packets = 00000000
Input Packet Errors = 00000000 ECC Errors = 00000000

```

## BPI Error Counters:

```

Bad Input Pkts = 22 Single-bit ECC Errors = 0
Bad Output Pkts = 22

```

## Queue Manager Error Counters:

```

BPRAM Bad End of Packets..= 00000000 Bonded Map Errors.....= 00000000
BPRAM Overflows.....= 00000000 BPRAM Bad Packet Type Errors = 00000000
Directed Map Error Counts = 00000000 BPRAM ECC Errors.....= 00000000
RLDRAM ECC Errors.....= 00000000 Queue Overflows.....= 00000000

```

## Sequencer Error Counters:

```

BlkRAM ECC Errors = 00000000

```

## ERP Error Counters:

```

Processor Bus Errored Address = 0x00000000

```

## Return Interface Error Counters:

```

Phys If Rx FIFO Oflow Drops = 00000000 Phys If LB FIFO Oflow Drops = 00000000
Sniffer FIFO Oflow Drops...= 00000000 Phys If Rx Parity Errors...= 00000000
Phys If Length Errors.....= 00000000 Phys If Rx FIFO ECC Errors..= 00000000
Phys If LB FIFO ECC Errors..= 00000000 Sniffer FIFO ECC Errors....= 00000000
SPI LB FIFO ECC Errors.....= 00000000

```

## Jib3-DS (Coldplay) interrupt events

```

count
current total bursts Event name
 21 25921 0 DOCSIS Processing Block: DSID Valid Error

```

## Internal error packet buffer:

```

```

## IPH Header:

```

Packet type..... = 0x00
Flags..... = 0x00
Packet Length..... = 33015 (0x80F7)
DOCSIS Header Length = 11
Replication Index... = 0
Stats Index..... = 0x0546
Flags2..... = 0x01040000
Service Flow..... = 0x00000000

```

## Packet Body:

```

0x010500E1 0x4411C0FA 0x00895500 0x118072C7
0x6A001D70 0xCC0BE208 0x0045B800 0xCA000000
0x003F1121 0x42AC2200 0x63AC2200 0x82C004C0
0x0200B600 0x008000F1 0x318FF541 0x1BA16AE2
0xB303AF17 0x1652643F 0x4498F48E 0xE278F16B
0x167521EC 0x3CBF34DD 0xDCBEA10E 0x0B5AA70C
0xE6B9B77F 0x8E3590ED 0x4EC9388A 0x9B886A51

```

## show controller integrated-cable

Internal magic number error packet buffer:

-----

No magic number errored packet available

The following example provides information about all controllers using the **show controller integrated-cable** command and the **fpga\_version** keyword:

Router# **show controllers integrated-Cable 7/0/0 fpga\_version**

2020 CARD FPGA VERSION

```
CORABI FPGA : 0.53
SPARROW FPGA : 0.309
WAXBILL FPGA : 1.7D
COLDPLAY FPGA : 2.2.1.D
REMORA FPGA : 0.1.0.14
FAUNA FPGA : 0.8.0.3
FLORA FPGA : 0.6.0.7
```

The following example provides information about all controllers using the **show controller integrated-cable** command and the **iofpga** keyword:

Router# **show controllers integrated-Cable 7/0/0 iofpga**

SPARROW PHY IOFPGA Registers - Address 0xF8800000:

| OFFSET | REGISTER                       | VALUE                                       |
|--------|--------------------------------|---------------------------------------------|
| 0x00   | Revision                       | 0x00000309                                  |
| 0x08   | DS RF Control                  | 0x80000003                                  |
| 0x0C   | FFT Process Low                | 0x80007006                                  |
| 0x1C   | DCM Lock status                | 0x00077411                                  |
| 0x20   | UPX SPI Control                | 0x00000000                                  |
| 0x24   | UPX SPI Respond                | 0x00000703                                  |
| 0xB0   | BCM 3140 SPI Start             | 0x00000000 0x00000000 0x00000000 0x00000000 |
| 0xC4   | BCM 3140 SPI Done              | 0x00000000 0x00000000 0x00000000 0x00000000 |
| 0xD8   | BCM3140 Reset                  | 0x000003FF                                  |
| 0x100  | FATAL Interrupt                | 0x00002000                                  |
| 0x104  | FATAL Interrupt Enable         | 0x001FD8FF                                  |
| 0x108  | HIGH Priority Interrupt        | 0x00000000                                  |
| 0x10C  | HIGH Priority Interrupt Enable | 0x00000000                                  |
| 0x110  | Low Priority Interrupt         | 0x00100000                                  |
| 0x114  | Low Priority Interrupt Enable  | 0x03E03C00                                  |
| 0x118  | CPU LB Data Parity Error       | 0x00000000                                  |
| 0x200  | Fauna ERP Interrupt Status     | 0x00000000                                  |
| 0x204  | Flora ERP Interrupt Status     | 0x00000000                                  |
| 0x208  | Coldplay ERP Interrupt Status  | 0x00000000                                  |
| 0x20C  | Remora ERP Interrupt Status    | 0x00000000                                  |
| 0x210  | VGA SPI RF Channel Selection   | 0x00000000                                  |
| 0x214  | VGA SPI RW Gain                | 0x0000009E                                  |
| 0x218  | VGA SPI Write Gain(raven)      | 0x00000000                                  |
| 0x220  | VGA Enable                     | 0x000FFFFF                                  |
| 0x300  | Fauna Reset                    | 0x00000003                                  |
| 0x304  | Flora Reset                    | 0x00000003                                  |
| 0x308  | Coldplay Reset                 | 0x00000003                                  |
| 0x30C  | Remora Reset                   | 0x00000007                                  |
| 0x310  | Upstream LED                   | 0x00003C00                                  |
| 0x380  | Downstream Density License LED | 0x00000000                                  |

\*\* Sparrow PHY I/O FPGA counters \*\*\*\*

Spurious FFT Interrupts: 0      Spurious FFT CHIP ID: 0      FFT RDY CLEAR Err: 0

FFT Data Ready: 2A6

UPX: SPI 0      Non-fatal 0      Boot OK 3

BCM3140: SPIA 0      SPIB 0      SPIC 0      SPID 0      SPIE 0

```
Non fatal US JIB Flora: 1 US JIB Fauna: 1
Non fatal DS JIB Coldplay: 1
```

```
Non fatal Remora FPGA: 1
```

```
US Port (BCM3140 channels):
0: 0 1: 0 2: 0 3: 0
4: 0 5: 0 6: 0 7: 0
8: 0 9: 0 10: 0 11: 0
12: 0 13: 0 14: 0 15: 0
16: 0 17: 0 18: 0 19: 0
```

The following example provides information about all controllers using the **show controller integrated-cable** command and the **mapping** keyword:

```
Router# show controllers integrated-Cable 6/0/0 mapping rf-channel
```

| Ctrlr | RF<br>channel | MC<br>BW % | MC Rem.<br>Ratio | WB<br>channel | WB<br>BW % | WB Rem.<br>Ratio |
|-------|---------------|------------|------------------|---------------|------------|------------------|
| 6/0/0 | 0             | 33         | 1                | 6/0/0:0       | 63         | 1                |
| 6/0/0 | 1             | 33         | 1                | 6/0/0:0       | 63         | 1                |
| 6/0/0 | 2             | 33         | 1                | 6/0/0:0       | 63         | 1                |
| 6/0/0 | 3             | 33         | 1                | 6/0/0:0       | 63         | 1                |

```
Router# show controllers integrated-Cable 6/0/0 mapping wb-channel
```

```
Load for five secs: 18%/1%; one minute: 11%; five minutes: 13%
```

```
Time source is NTP, *15:07:17.566 EDT Sun Mar 21 2010
```

| Ctrlr | WB<br>channel | RF<br>channel | BW % | Remaining<br>Ratio |
|-------|---------------|---------------|------|--------------------|
| 6/0/0 | 0             | 6/0/0:0       | 63   | 1                  |
|       |               | 6/0/0:1       | 63   | 1                  |
|       |               | 6/0/0:2       | 63   | 1                  |
|       |               | 6/0/0:3       | 63   | 1                  |

The following example provides information about all controllers using the **show controller integrated-cable** command and the **registers** keyword:

```
Router# show controllers integrated-Cable 6/0/0 registers
```

```
JIB3_DS BPI registers (base address 0xF8880000)
```

|                             |                           |
|-----------------------------|---------------------------|
| bpi_int_isr_0               | [0x00000000] = 0x00000000 |
| bpi_int_ier_0               | [0x00000004] = 0x0000000F |
| glb_int_isr_0               | [0x00000010] = 0x00000000 |
| glb_int_ier_0               | [0x00000014] = 0x000003FF |
| glb_int_isr_1               | [0x00000020] = 0x00000000 |
| glb_int_ier_1               | [0x00000024] = 0x000003FF |
| bpi_int_fesr_0              | [0x00000040] = 0x00000000 |
| bpi_tst_tp_sel_reg          | [0x00000050] = 0x00000000 |
| bpi_tst_tp_reg              | [0x00000054] = 0x00000000 |
| bpi_cnt_good_packet_in_cnt  | [0x00000064] = 0x00045B37 |
| bpi_cnt_bad_packet_in_cnt   | [0x00000068] = 0x0000000D |
| bpi_cnt_good_packet_out_cnt | [0x0000006C] = 0x00045B37 |
| bpi_cnt_bad_packet_out_cnt  | [0x00000070] = 0x0000000D |
| bpi_ecc_sbit_err_cnt        | [0x00000074] = 0x00000000 |
| glb_sw_rev_id               | [0x00000078] = 0x00020002 |
| glb_hw_rev_id               | [0x0000007C] = 0x00010008 |
| frz_reg                     | [0x00000080] = 0x00000000 |
| frz_en                      | [0x00000084] = 0x00000001 |
| glb_dcm_status              | [0x00000088] = 0x00000007 |
| glb_sw_rst                  | [0x0000008C] = 0x00000000 |

```
JIB3_DS ERP registers (base address 0xF8881000)
```

## ■ show controller integrated-cable

```

erp_irq_src_reg [0x00000000] = 0x00000000
erp_irq_en_reg [0x00000004] = 0x80000FFF
erp_tp_sel_reg [0x00000050] = 0x00000000
erp_tp_reg [0x00000054] = 0x00000000
erp_cfg_reg [0x00000060] = 0x00000000
erp_err_record_reg [0x00000064] = 0x00000000
erp_err_addr_record_reg [0x00000068] = 0x00000000
erp_err_wd_record_reg [0x0000006C] = 0x00000000
erp_proc_err_addr_record_reg [0x00000090] = 0x00000000

```

JIB3\_DS RX SPI registers (base address 0xF8882000)

```

rxspi_irq_src_reg [0x00000000] = 0x00000000
rxspi_irq_en_reg [0x00000004] = 0x000001FF
rxspi_ferr_src_reg [0x00000040] = 0x00000000
rxspi_testpoint_sel_reg [0x00000050] = 0x00000000
rxspi_testpoint_reg [0x00000054] = 0x00000000
rxspi_rst_cntl_reg [0x00000060] = 0x00000000
rxspi_cntl_status_reg [0x00000064] = 0x00000005
rxspi_cfg_cntl_reg [0x00000068] = 0x00000021
rxspi_afthres_reg [0x0000006C] = 0x01C00180
rxspi_cal_dur_reg [0x00000070] = 0x00030000
rxspi_non_drop_err_cnt_reg [0x00000088] = 0x00000000
rxspi_drop_byte_cnt_reg [0x0000008C] = 0x00000000
rxspi_rx_byte_cnt_reg[0] [0x000000B0] = 0x01A499EF
rxspi_rx_byte_cnt_reg[1] [0x000000B4] = 0x00CF4ED0
rxspi_rx_byte_cnt_reg[2] [0x000000B8] = 0x0001F030
rxspi_rx_pkt_cnt_reg[0] [0x000000C0] = 0x0001D242
rxspi_rx_pkt_cnt_reg[1] [0x000000C4] = 0x0002828C
rxspi_rx_pkt_cnt_reg[2] [0x000000C8] = 0x00000684
rxspi_fifo_pkt_drop_cnt_reg[0] [0x000000E0] = 0x00000000
rxspi_fifo_pkt_drop_cnt_reg[1] [0x000000E4] = 0x00000000
rxspi_fifo_pkt_drop_cnt_reg[2] [0x000000E8] = 0x00000000
rxspi_calendar_table_reg[0] [0x00000800] = 0x00000000
rxspi_calendar_table_reg[1] [0x00000804] = 0x00000001
rxspi_calendar_table_reg[2] [0x00000808] = 0x00000002
rxspi_calendar_table_reg[3] [0x0000080C] = 0x00000003

```

JIB3\_DS TX SPI registers (base address 0xF8883000)

```

txspi_irq_src_reg [0x00000000] = 0x00000000
txspi_irq_en_reg [0x00000004] = 0x0000001F
txspi_ferr_src_reg [0x00000040] = 0x00000000
txspi_testpoint_sel_reg [0x00000050] = 0x00000000
txspi_testpoint_reg [0x00000054] = 0x00000000
txspi_rst_cntl_reg [0x00000060] = 0x00000000
txspi_cntl_status_reg [0x00000064] = 0x00000009
txspi_cfg_cntl_reg [0x00000068] = 0x00000001
txspi_afthres_reg [0x0000006C] = 0x01EC01E8
txspi_cal_dur_reg [0x00000070] = 0x00040000
txspi_train_cntl_reg [0x00000074] = 0x00000000
txspi_nonfatalerr_cnt_reg [0x00000080] = 0x00000000
txspi_eop_abort_pkt_cnt_reg[0] [0x00000090] = 0x00000000
txspi_eop_abort_pkt_cnt_reg[1] [0x00000094] = 0x00000000
txspi_eop_abort_pkt_cnt_reg[2] [0x00000098] = 0x00000000
txspi_eop_abort_pkt_cnt_reg[3] [0x0000009C] = 0x00000000
txspi_eop_abort_byte_cnt_reg[0] [0x000000A0] = 0x00000000
txspi_eop_abort_byte_cnt_reg[1] [0x000000A4] = 0x00000000
txspi_eop_abort_byte_cnt_reg[2] [0x000000A8] = 0x00000000
txspi_eop_abort_byte_cnt_reg[3] [0x000000AC] = 0x00000000
txspi_tx_byte_cnt_reg[0] [0x000000C0] = 0x00000000
txspi_tx_byte_cnt_reg[1] [0x000000C4] = 0x00000000
txspi_tx_byte_cnt_reg[2] [0x000000C8] = 0x00000000

```

```

txspi_tx_byte_cnt_reg[3] [0x000000CC] = 0x00000000
txspi_tx_pkt_cnt_reg[0] [0x00000100] = 0x00000000
txspi_tx_pkt_cnt_reg[1] [0x00000104] = 0x00000000
txspi_tx_pkt_cnt_reg[2] [0x00000108] = 0x00000000
txspi_tx_pkt_cnt_reg[3] [0x0000010C] = 0x00000000
txspi_calendar_table_reg[0] [0x00000800] = 0x00000000
txspi_calendar_table_reg[1] [0x00000804] = 0x00000001
txspi_calendar_table_reg[2] [0x00000808] = 0x00000002
txspi_calendar_table_reg[3] [0x0000080C] = 0x00000003
txspi_calendar_table_reg[4] [0x00000810] = 0x00000004

```

JIB3\_DS DOC registers (base address 0xF8884000)

```

doc_int_err0 [0x00000000] = 0x00000000
doc_int_err0_ier [0x00000004] = 0xFFFBFFFD
doc_int_err1 [0x00000010] = 0x00000000
doc_int_err1_ier [0x00000014] = 0x003FFFF8
doc_int_fesr [0x00000040] = 0x00000000
doc_test_sel [0x00000050] = 0x00000000
doc_testpoint [0x00000054] = 0x00000000
doc_cfg_ctrl [0x00000060] = 0x031A0000
doc_err_cap_ctrl [0x00000064] = 0x001F0001
doc_err_cap_addr [0x00000068] = 0x00000020
doc_err_cap_data [0x0000006C] = 0x000080F7
doc_seg_num [0x00000070] = 0x00000001
doc_wb_chan_stats_sel [0x00000074] = 0x00000077
doc_wb_pkt_cnt [0x00000078] = 0x00000000
doc_wb_byte_cnt [0x0000007C] = 0x00000000
doc_wb_police_sel [0x00000080] = 0x00000001
doc_wb_police_data [0x00000084] = 0x00000000
doc_wb_police_intv [0x00000088] = 0x00000000
doc_nb_chan_stats_sel [0x0000008C] = 0x0000004C
doc_nb_pkt_cnt [0x00000090] = 0x00000000
doc_nb_byte_cnt [0x00000094] = 0x00000000
doc_nb_police_sel [0x00000098] = 0x00000001
doc_nb_police_data [0x0000009C] = 0x00000000
doc_nb_police_intv [0x000000A0] = 0x00000000
doc_int_doc_cnt [0x000000D4] = 0x00000000
doc_int_ecc_sbiterr_cnt [0x000000D8] = 0x00000000
doc_pkt_good_in_cnt [0x000000DC] = 0x00045B5C
doc_pkt_good_out_cnt [0x000000E0] = 0x00045B39
doc_pkt_err_in_cnt [0x000000E4] = 0x00000000
doc_pkt_err_out_cnt [0x000000E8] = 0x00000023
doc_pkt_drop_cnt [0x000000EC] = 0x00000000
doc_efc_all_cnt [0x000000F0] = 0x00000000
doc_efc_hi_cnt [0x000000F4] = 0x00000000
doc_efc_me_cnt [0x000000F8] = 0x00000000
doc_efc_lo_cnt [0x000000FC] = 0x00000000
doc_efc_ch_sel [0x00000100] = 0x00000000
doc_efc_debug_ctrl [0x00000104] = 0x00000000
doc_rldram_ext_ecc [0x00000114] = 0x00000000
doc_rldram_cfg [0x00000118] = 0x00101544
doc_rldram_ctrl [0x0000011C] = 0x00100389
doc_rldram_status [0x00000120] = 0x039D7403
doc_rldram_blk_clr [0x00000124] = 0x0B7FFFFF
doc_rldram_cal_match_win_h [0x00000128] = 0x00000000
doc_rldram_cal_match_win_l [0x0000012C] = 0x1FFFFFFF
doc_rldram_ecc_err_rec_addr [0x00000130] = 0x00000000
doc_magic_num_err_pkt_ctrl [0x00000150] = 0x00000000
doc_magic_num_err_pkt_addr [0x00000154] = 0x00000001
doc_magic_num_err_pkt_data [0x00000158] = 0x00000000

```

JIB3\_DS RIF registers (base address 0xF8885000)

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```

rif_int_err0 [0x00000000] = 0x00000000
rif_int_ier0 [0x00000004] = 0x00000007
rif_int_fesr0 [0x00000040] = 0x00000000
rif_tp_sel [0x00000050] = 0x00000000
rif_tp [0x00000054] = 0x00000000
rif_cfg_ctrl [0x00000060] = 0x00000000
rif_cnt_in_mpeg_cnt [0x00000064] = 0x000A6226
rif_cnt_out_good_mpeg_cnt [0x00000068] = 0x000A6226
rif_cnt_out_bad_mpeg_cnt [0x0000006C] = 0x00000000
rif_cnt_drop_mpeg_cnt [0x00000070] = 0x00000000
rif_lbit_ecc_err_stat [0x00000074] = 0x00000000

```

JIB3\_DS RTN registers (base address 0xF8886000)

```

return_int_isr [0x00000000] = 0x00000000
return_int_ier [0x00000004] = 0x000001FF
return_int_fesr [0x00000040] = 0x00000000
return_tp_sel [0x00000050] = 0x00000000
return_tp [0x00000054] = 0x00000000
return_ctrl_reg [0x00000060] = 0x00000000
return_pif_loopback_chnl [0x00000064] = 0x00000000
return_sniffer_nonbonded_en [0x00000068] = 0x00000000
return_sniffer_bonded_en [0x0000006C] = 0x00000000
return_spi_chnl_sel [0x00000070] = 0x0000013A
return_err_drop_en [0x00000074] = 0x0000000F
return_snf_macda_cfg_addr [0x00000078] = 0x0000000F
return_snf_macda_cfg_data_hi [0x0000007C] = 0x00000000
return_snf_macda_cfg_data_lo [0x00000080] = 0x00000000
return_in_pifrx_good_cnt [0x000000A0] = 0x00000000
return_in_pifrx_bad_cnt [0x000000A4] = 0x00000000
return_in_piflp_good_cnt [0x000000A8] = 0x000A6224
return_in_piflp_bad_cnt [0x000000AC] = 0x00000000
return_in_sniffer_good_cnt [0x000000B0] = 0x00045B3A
return_in_sniffer_bad_cnt [0x000000B4] = 0x00000023
return_in_spi_loop_good_cnt [0x000000B8] = 0x00000000
return_in_spi_loop_bad_cnt [0x000000BC] = 0x00000000
return_out_spi0_cnt [0x000000C0] = 0x00000000
return_out_spi1_cnt [0x000000C4] = 0x00000000
return_out_spi2_cnt [0x000000C8] = 0x00000000
return_out_spi3_cnt [0x000000CC] = 0x00000000
return_out_spi4_cnt [0x000000D0] = 0x00000000
return_pifrx_if_par_err_drop_cnt [0x000000D4] = 0x00000000
return_pifrx_if_len_err_drop_cnt [0x000000D8] = 0x00000000
return_piflp_if_err_drop_cnt [0x000000DC] = 0x00000000
return_piflp_if_chnl_drop_cnt [0x000000E0] = 0x00000000
return_snf_pb_err_drop_cnt [0x000000E4] = 0x00000023
return_snf_pkt_type_err_drop_cnt [0x000000E8] = 0x00045B3A
return_spilp_if_err_drop_cnt [0x000000EC] = 0x00000000
return_pifrx_traffic_mux_drop_cnt [0x000000F0] = 0x00000000
return_piflp_traffic_mux_drop_cnt [0x000000F4] = 0x00000000
return_snf_traffic_mux_drop_cnt [0x000000F8] = 0x00000000
return_spilp_traffic_mux_drop_cnt [0x000000FC] = 0x00000000
return_pifrx_fifo_overflow_drop_cnt [0x00000100] = 0x00000000
return_piflp_fifo_overflow_drop_cnt [0x00000104] = 0x00000000
return_snf_fifo_overflow_drop_cnt [0x00000108] = 0x00000000
return_piflp_fifo_overflow_drop_cnt [0x0000010C] = 0x00000000
return_pifrx_if_par_err_cnt [0x00000110] = 0x00000000
return_pifrx_if_len_err_cnt [0x00000114] = 0x00000000
return_pifrx_fifo_ecc_1berr_cnt [0x00000118] = 0x00000000
return_piflp_fifo_ecc_1berr_cnt [0x0000011C] = 0x00000000
return_snf_fifo_ecc_1berr_cnt [0x00000120] = 0x00000000
return_spilp_fifo_ecc_1berr_cnt [0x00000124] = 0x00000000

```

JIB3\_DS DLM registers (base address 0xF8890000)

```

d1m_int_isr_0 [0x00000000] = 0x00000004
d1m_int_ier_0 [0x00000004] = 0x00000000
d1m_cnt_local_ts_reg [0x00000064] = 0x8D7DF4CD
d1m_cfg_tss_comp_reg [0x00000068] = 0x00000027
d1m_cfg_tss_ctrl_reg [0x0000006C] = 0x00000000
d1m_cfg_tss_cmd_reg [0x00000070] = 0x00000000
d1m_cnt_ts_load_cnt [0x000000BC] = 0x00000000
d1m_cnt_ts_chk_failed_cnt [0x000000C4] = 0x00000000
d1m_cnt_tss_perr_cnt [0x000000C8] = 0x00000000
d1m_cnt_load_ts_reg [0x000000D0] = 0x003F52EF

```

JIB3\_DS SEQ registers (base address 0xF8892000)

```

seq_int_err0 [0x00000000] = 0x0000000F
seq_int_ier0 [0x00000004] = 0x000FFFFF
seq_int_err3 [0x00000030] = 0x00000000
seq_int_ier3 [0x00000034] = 0x00000001
seq_int_fatal_err [0x00000040] = 0x00000000
seq_tp_sel [0x00000050] = 0x00000000
seq_tp [0x00000054] = 0x00000000
seq_cfg_en [0x00000060] = 0x00000001
seq_cfg_sync_timer_sel [0x00000064] = 0x00000014
seq_cfg_sync_timer_data [0x00000068] = 0x00000000
seq_cfg_sync_sa_sel [0x0000006C] = 0x00000014
seq_cfg_sync_sa_data_lo [0x00000070] = 0x00000000
seq_cfg_sync_sa_data_hi [0x00000074] = 0x00000000
seq_cfg_tkb_timer_sel [0x00000078] = 0x00000015
seq_cfg_tkb_timer_data [0x0000007C] = 0x00000000
seq_cfg_tkb_max [0x00000080] = 0x00000000
seq_hwdbg_dpv_proc_table_addr [0x00000090] = 0x00000001
seq_hwdbg_dpv_ptr_mod_table [0x00000094] = 0x00000000
seq_hwdbg_dpv_timestamp_table [0x00000098] = 0x00000000
seq_hwdbg_dpv_hcs_table [0x0000009C] = 0x00000000
seq_cnt_blkram_oecc_err_stat [0x000000A4] = 0x00000000
seq_cnt_tran_mpeg_stat [0x000000A8] = 0x000A6224
seq_cnt_tran_mpeg_sync_stat [0x000000AC] = 0x00000000
seq_cnt_tran_only_sync_stat [0x000000B0] = 0x00000000
seq_cnt_tran_dpv_stat [0x000000B8] = 0x00000000

```

JIB3\_DS QM registers (base address 0xF8893000)

```

qm_int_isr0 [0x00000000] = 0x00000000
qm_int_ier0 [0x00000004] = 0x0000007F
qm_int_isr1 [0x00000010] = 0x00000000
qm_int_ier1 [0x00000014] = 0x000FFFFF
qm_int_fat_err_isr [0x00000040] = 0x00000000
qm_tst_tp_sel [0x00000050] = 0x00000000
qm_tst_tp [0x00000054] = 0x00000000
qm_cfg_chnl_rst_0 [0x00000060] = 0x00000000
qm_cfg_ctl [0x0000006C] = 0x00000011
qm_cfg_sqf_fac_addr [0x0000008C] = 0x00000015
qm_cfg_sqf_fac_data [0x00000090] = 0x00000000
qm_cfg_bond_chnl_map_addr [0x00000094] = 0x00000020
qm_cfg_bond_chnl_map_data_lo [0x00000098] = 0x00000000
qm_cfgflt_thr_addr [0x000000A4] = 0x00000250
qm_cfgflt_thr_data [0x000000A8] = 0x00000000
qm_cfg_repl_addr [0x000000AC] = 0x00000000
qm_cfg_repl_data_lo [0x000000B0] = 0x00000000
qm_hwdbg_buf_mag_addr [0x000000BC] = 0x00000001
qm_hwdbg_wptra_data_lo [0x000000C0] = 0x00014F60
qm_hwdbg_wptra_data_mi [0x000000C4] = 0x000033A0
qm_hwdbg_wptra_data_hi [0x000000C8] = 0x00000AA0
qm_hwdbg_rptr_data_lo [0x000000CC] = 0x00014F60

```

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```

qm_hwdbg_rpctr_data_mi [0x000000D0] = 0x000033A0
qm_hwdbg_rpctr_data_hi [0x000000D4] = 0x00000AA0
qm_hwdbg_qulen_data_lo [0x000000D8] = 0x00000000
qm_hwdbg_qulen_data_mi [0x000000DC] = 0x000000E7
qm_hwdbg_qulen_data_hi [0x000000E0] = 0x00000000
qm_hwdbg_contex_data [0x000000E4] = 0x00000000
qm_cfg_dir_stat_addr [0x000000E8] = 0x0000004E
qm_cnt_dir_pkt_stat [0x000000EC] = 0x00000000
qm_cnt_dir_byte_stat [0x000000F0] = 0x00000000
qm_cfg_qam_stat_addr [0x000000F4] = 0x0000004C
qm_cnt_qam_chnl_pkt_stat [0x000000F8] = 0x00000000
qm_cnt_qam_chnl_byte_stat [0x000000FC] = 0x00000000
qm_cnt_qam_chnl_sync_stat [0x00000100] = 0x00000000
qm_cnt_bpram_ovrflw_stat [0x00000108] = 0x00000000
qm_cnt_que_ovrflw_stat [0x0000010C] = 0x00000000
qm_cnt_good_bpi_pkt_stat [0x00000110] = 0x00045B3C
qm_cnt_bad_bpi_pkt_stat [0x00000114] = 0x0000000D
qm_cnt_bpram_out_good_pkt_stat [0x0000011C] = 0x000BD95D
qm_cnt_bpram_out_dir_pkt_stat [0x00000120] = 0x00028918
qm_cnt_bpram_out_bonded_pkt_stat [0x00000124] = 0x00000029
qm_cnt_replicated_pkt_stat [0x00000128] = 0x000A0738
qm_cnt_bpram_bad_type_pkt_stat [0x00000134] = 0x00000000
qm_cnt_bpram_bad_eop_pkt_stat [0x00000138] = 0x00000000
qm_cnt_bpram_bad_dir_pkt_stat [0x0000013C] = 0x00000000
qm_cnt_bpram_bad_bonded_pkt_stat [0x00000140] = 0x00000000
qm_cnt_bpram_oecc_err_pkt_stat [0x00000144] = 0x00000000
qm_cnt_bpram_bad_pkt_stat [0x00000148] = 0x0000000D
qm_cnt_wr_good_pkt_stat [0x0000014C] = 0x000BD95D
qm_cnt_wr_bad_pkt_stat [0x00000150] = 0x00000000
qm_cnt_drop_bad_pkt_stat [0x00000154] = 0x0000000D
qm_cnt_drop_ovrflw_pkt_stat [0x00000158] = 0x00000000
qm_cnt_rd_pkt_stat [0x0000015C] = 0x000BD933
qm_cnt_rd_mpeg_stat [0x00000160] = 0x000A6226
qm_cnt_rd_mpeg_sync_stat [0x00000164] = 0x00008140
qm_cnt_rd_mpeg_only_sync_stat [0x00000168] = 0x00007E93
qm_cnt_tran_pkt_stat [0x00000170] = 0x000BD95E
qm_cnt_tran_oecc_err_pkt_stat [0x00000174] = 0x00000000
qm_cnt_tran_mpeg_stat [0x00000178] = 0x000A6226
qm_cnt_tran_mpeg_sync_stat [0x0000017C] = 0x00008140
qm_cnt_tran_mpeg_only_sync_stat [0x00000180] = 0x00007E93
qm_cnt_tran_dpv_stat [0x00000188] = 0x00000000
qm_rldram_ext_ecc [0x00000198] = 0x00000000
qm_rldram_cfg [0x0000019C] = 0x00101544
qm_rldram_ctrl [0x000001A0] = 0x00100389
qm_rldram_status [0x000001A4] = 0x03DF7C03
qm_rldram_cal_match_win_h [0x000001A8] = 0x00000000
qm_rldram_cal_match_win_l [0x000001AC] = 0x7FFFFFFF

```

JIB3\_DS PG registers (base address 0xF8898000)

```

pg_mod [0x00000050] = 0x00000000
pg_dhs [0x00000054] = 0x00000000
pg_ipg [0x0000005C] = 0x00000000
pg_num [0x00000058] = 0x00000000
pg_payload_length [0x00000060] = 0x00000000
pg_payload_value [0x00000064] = 0x00000000
pg_pkt_hdr_prog_0 [0x00000068] = 0x00000000
pg_pkt_hdr_prog_1 [0x0000006C] = 0x00000000
pg_pkt_hdr_1 [0x00000070] = 0x00000000
pg_pkt_hdr_2 [0x00000074] = 0x00000000
pg_pkt_hdr_3 [0x00000078] = 0x00000000
pg_pkt_hdr_4 [0x0000007C] = 0x00000000
pg_pkt_hdr_5 [0x00000080] = 0x00000000
pg_pkt_hdr_6 [0x00000084] = 0x00000000

```



JIB3\_DS PMBIST registers (base address 0xF8899000)

|                          |              |              |
|--------------------------|--------------|--------------|
| pmbist_ena_addr          | [0x00000060] | = 0x00000002 |
| pmbist_din_addr          | [0x00000064] | = 0x00000000 |
| pmbist_dout_addr         | [0x0000006C] | = 0x00008101 |
| pmbist_trgt_select_addr  | [0x00000074] | = 0x00000000 |
| pmbist_ff_status         | [0x00000078] | = 0x00000000 |
| pmbist_num_wr_fr_pmbist  | [0x0000007C] | = 0x00000000 |
| pmbist_num_rd_fr_pmbist  | [0x00000080] | = 0x00000000 |
| pmbist_um_wr_2cmd_ff     | [0x00000084] | = 0x00000000 |
| pmbist_num_rd_2cmd_ff    | [0x00000088] | = 0x00000000 |
| pmbist_num_rd_rtn_pmbist | [0x0000008C] | = 0x00000000 |
| pmbist_num_wr_2dram      | [0x00000090] | = 0x00000000 |
| pmbist_num_rd_2dram      | [0x00000094] | = 0x00000000 |
| pmbist_num_rd_fr_dram    | [0x00000098] | = 0x00000000 |

Remora registers (base address 0xF8900000)

Remora General Registers (0xF8900000):

|                  |              |              |
|------------------|--------------|--------------|
| revision         | [0x00000000] | = 0x00000003 |
| hw_fpga_rev_id   | [0x00000004] | = 0x0000000A |
| erp_scratch_pad0 | [0x00000008] | = 0x00000000 |
| erp_scratch_pad1 | [0x0000000C] | = 0x00000000 |

Remora Reset and DCM Lock Registers (0xF8900100):

|            |              |              |
|------------|--------------|--------------|
| reset_ctrl | [0x00000100] | = 0x00000000 |
| dcm_lock   | [0x00000104] | = 0x0000000F |

Remora Configuration Registers (0xF8900200):

|                            |              |              |
|----------------------------|--------------|--------------|
| port_cfg[0]                | [0x00000200] | = 0x00155549 |
| port_cfg[1]                | [0x00000204] | = 0x00155548 |
| port_cfg[2]                | [0x00000208] | = 0x00155548 |
| port_cfg[3]                | [0x0000020C] | = 0x00155548 |
| port_cfg[4]                | [0x00000210] | = 0x00155548 |
| core_config_status         | [0x00000214] | = 0x00000020 |
| port_rm2tifo_prog_flags[0] | [0x00000218] | = 0xBBA20C0D |
| port_rm2tifo_prog_flags[1] | [0x0000021C] | = 0xBBA20C0D |
| port_rm2tifo_prog_flags[2] | [0x00000220] | = 0xBBA20C0D |
| port_rm2tifo_prog_flags[3] | [0x00000224] | = 0xBBA20C0D |
| port_rm2tifo_prog_flags[4] | [0x00000228] | = 0xBBA20C0D |

Remora DFT/Pattern Inject Registers (0xF8900300):

|                        |              |              |
|------------------------|--------------|--------------|
| alt_sym_tst_mode       | [0x00000300] | = 0x00005A69 |
| alt_sym_tst_en_reg     | [0x00000304] | = 0x00000000 |
| qdr_mem_test_en_reg    | [0x00000308] | = 0x00000000 |
| qdr_mem_test_rd_wr_reg | [0x0000030C] | = 0x00000A12 |
| ready_for_data_input   | [0x00000318] | = 0x0000001F |

Remora ECC Registers (0xF8900400):

|                              |              |              |
|------------------------------|--------------|--------------|
| debug_cfg                    | [0x00000400] | = 0x00000000 |
| sniff_frame_cnt              | [0x00000404] | = 0x00000000 |
| ecc_parity_conf_reg          | [0x00000408] | = 0x00000003 |
| ecc_uncorrect_data_log_reg   | [0x0000040C] | = 0x00002814 |
| ecc_uncorrect_log_reg        | [0x00000410] | = 0x00000020 |
| ecc_correctable_data_log_reg | [0x00000414] | = 0x00002C14 |
| ecc_correctable_log_reg      | [0x00000418] | = 0x00000028 |

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```

qdr_ecc_corr_cnt_reg [0x0000041C] = 0x00000000
fatal_err_log [0x00000420] = 0x00000000
err_inj_reg [0x00000424] = 0x00000000

```

## Remora QDR Registers (0xF8900500):

```

qdr_phy_idelayctrl_rst_reg [0x00000500] = 0x00000000
qdr_phy_idelayctrl_rdy_err_reg [0x00000504] = 0x00000261
qdr_phy_cal_tap_dly_reg [0x00000508] = 0x00000ADB
qdr_phy_idelayctrl_ctrl_reg [0x0000050C] = 0x00000002
qdr_init_ctrl_reg [0x00000510] = 0x801FFFFF

```

## Remora Interrupt Status Registers (0xF8900600):

```

glb_int_stat_reg [0x00000600] = 0x00000000
int_stat_gr_reg[0] [0x00000604] = 0x00000000
int_stat_gr_reg[1] [0x00000608] = 0x00000000
int_stat_gr_reg[2] [0x0000060C] = 0x00000000
int_stat_gr_reg[3] [0x00000610] = 0x00000000
int_stat_gr_reg[4] [0x00000614] = 0x00000000
misc_int_stat_reg [0x00000618] = 0x00000001
fatal_err_src_reg [0x0000061C] = 0x00000000
port_local_interrupt_enable[0] [0x00000620] = 0x0001FFFF
port_local_interrupt_enable[1] [0x00000624] = 0x0001FFFF
port_local_interrupt_enable[2] [0x00000628] = 0x0001FFFF
port_local_interrupt_enable[3] [0x0000062C] = 0x0001FFFF
port_local_interrupt_enable[4] [0x00000630] = 0x0001FFFF
misc_int_en_reg [0x00000634] = 0x00001FF8
fatal_err_en_reg [0x00000638] = 0x000000EF
port_local_interrupt_override[0] [0x0000063C] = 0x00000000
port_local_interrupt_override[1] [0x00000640] = 0x00000000
port_local_interrupt_override[2] [0x00000644] = 0x00000000
port_local_interrupt_override[3] [0x00000648] = 0x00000000
port_local_interrupt_override[4] [0x0000064C] = 0x00000000
misc_int_override [0x00000650] = 0x00000000
fatal_err_override [0x00000654] = 0x00000000

```

## Remora Counts Registers (0xF8900800):

```

illegal_ch_num_pkt_drop_count [0x00000800] = 0x00000000
fifo_full_mpeg_pkt_drop_count_hi [0x00000804] = 0x00000000
fifo_full_mpeg_pkt_drop_count_lo [0x00000808] = 0x00000000
channel_mpeg_pkt_count[0] [0x0000080C] = 0x00001118
channel_mpeg_pkt_count[1] [0x00000810] = 0x0000106B
channel_mpeg_pkt_count[2] [0x00000814] = 0x00000913
channel_mpeg_pkt_count[3] [0x00000818] = 0x00000A6D
channel_mpeg_pkt_count[4] [0x0000081C] = 0x00000000
channel_mpeg_pkt_count[5] [0x00000820] = 0x00000000
channel_mpeg_pkt_count[6] [0x00000824] = 0x00000000
channel_mpeg_pkt_count[7] [0x00000828] = 0x00000000
channel_mpeg_pkt_count[8] [0x0000082C] = 0x00000000
channel_mpeg_pkt_count[9] [0x00000830] = 0x00000000
channel_mpeg_pkt_count[10] [0x00000834] = 0x00000000
channel_mpeg_pkt_count[11] [0x00000838] = 0x00000000
channel_mpeg_pkt_count[12] [0x0000083C] = 0x00000000
channel_mpeg_pkt_count[13] [0x00000840] = 0x00000000
channel_mpeg_pkt_count[14] [0x00000844] = 0x00000000
channel_mpeg_pkt_count[15] [0x00000848] = 0x00000000
channel_mpeg_pkt_count[16] [0x0000084C] = 0x00000000
channel_mpeg_pkt_count[17] [0x00000850] = 0x00000000
channel_mpeg_pkt_count[18] [0x00000854] = 0x00000000
channel_mpeg_pkt_count[19] [0x00000858] = 0x00000000
port_re_timestamp_count[0] [0x0000085C] = 0xA6A5A6A6
port_re_timestamp_count[1] [0x00000860] = 0x00000000

```

```

port_re_timestamp_count[2] [0x00000864] = 0x00000000
port_re_timestamp_count[3] [0x00000868] = 0x00000000
port_re_timestamp_count[4] [0x0000086C] = 0x00000000
port_rx_fifo_overflow_drop_count[0] [0x00000870] = 0x00000000
port_rx_fifo_overflow_drop_count[1] [0x00000874] = 0x00000000
port_rx_fifo_overflow_drop_count[2] [0x00000878] = 0x00000000
port_rx_fifo_overflow_drop_count[3] [0x0000087C] = 0x00000000
port_rx_fifo_overflow_drop_count[4] [0x00000880] = 0x00000000
channel_jib_if_pkt_count[0] [0x00000884] = 0x00038EA2
channel_jib_if_pkt_count[1] [0x00000888] = 0x00031ADE
channel_jib_if_pkt_count[2] [0x0000088C] = 0x0001B869
channel_jib_if_pkt_count[3] [0x00000890] = 0x00020053
channel_jib_if_pkt_count[4] [0x00000894] = 0x00000000
channel_jib_if_pkt_count[5] [0x00000898] = 0x00000000
channel_jib_if_pkt_count[6] [0x0000089C] = 0x00000000
channel_jib_if_pkt_count[7] [0x000008A0] = 0x00000000
channel_jib_if_pkt_count[8] [0x000008A4] = 0x00000000
channel_jib_if_pkt_count[9] [0x000008A8] = 0x00000000
channel_jib_if_pkt_count[10] [0x000008AC] = 0x00000000
channel_jib_if_pkt_count[11] [0x000008B0] = 0x00000000
channel_jib_if_pkt_count[12] [0x000008B4] = 0x00000000
channel_jib_if_pkt_count[13] [0x000008B8] = 0x00000000
channel_jib_if_pkt_count[14] [0x000008BC] = 0x00000000
channel_jib_if_pkt_count[15] [0x000008C0] = 0x00000000
channel_jib_if_pkt_count[16] [0x000008C4] = 0x00000000
channel_jib_if_pkt_count[17] [0x000008C8] = 0x00000000
channel_jib_if_pkt_count[18] [0x000008CC] = 0x00000000
channel_jib_if_pkt_count[19] [0x000008D0] = 0x00000000

```

#### Remora Timestamp Registers (0xF8900900):

```

local_1024_ts_ctrl [0x00000900] = 0x00000039
local_1024_current_ts [0x00000904] = 0xF5D27575
local_1024_tcc_ts_latch [0x00000908] = 0x7291125F
doc_ts_offset_ch_0_1 [0x0000090C] = 0x04AF04AF
doc_ts_offset_ch_2_3 [0x00000910] = 0x04AF04AF
doc_ts_offset_ch_4_5 [0x00000914] = 0x04F704F7
doc_ts_offset_ch_6_7 [0x00000918] = 0x04F704F7
doc_ts_offset_ch_8_9 [0x0000091C] = 0x04F704F7
doc_ts_offset_ch_10_11 [0x00000920] = 0x04F704F7
doc_ts_offset_ch_12_13 [0x00000924] = 0x04F704F7
doc_ts_offset_ch_14_15 [0x00000928] = 0x04F704F7
doc_ts_offset_ch_16_17 [0x0000092C] = 0x04F704F7
doc_ts_offset_ch_18_19 [0x00000930] = 0x04F704F7

```

#### Remora PRATE/SRATE Registers (0xF8900A00):

```

port_prate_regs[0].prate_ctrl [0x00000A00] = 0x00000003
port_prate_regs[0].prate_m_prime_lo [0x00000A04] = 0x0005971E
port_prate_regs[0].prate_n_prime_lo [0x00000A08] = 0x08AA5B88
port_prate_regs[0].prate_m_prime_hi [0x00000A0C] = 0x00000000
port_prate_regs[1].prate_ctrl [0x00000A10] = 0x00000003
port_prate_regs[1].prate_m_prime_lo [0x00000A14] = 0x00000191
port_prate_regs[1].prate_n_prime_lo [0x00000A18] = 0x00037E78
port_prate_regs[1].prate_m_prime_hi [0x00000A1C] = 0x00000000
port_prate_regs[2].prate_ctrl [0x00000A20] = 0x00000003
port_prate_regs[2].prate_m_prime_lo [0x00000A24] = 0x00000191
port_prate_regs[2].prate_n_prime_lo [0x00000A28] = 0x00037E78
port_prate_regs[2].prate_m_prime_hi [0x00000A2C] = 0x00000000
port_prate_regs[3].prate_ctrl [0x00000A30] = 0x00000003
port_prate_regs[3].prate_m_prime_lo [0x00000A34] = 0x00000191
port_prate_regs[3].prate_n_prime_lo [0x00000A38] = 0x00037E78
port_prate_regs[3].prate_m_prime_hi [0x00000A3C] = 0x00000000
port_prate_regs[4].prate_ctrl [0x00000A40] = 0x00000003

```

## show controller integrated-cable

```

port_prate_regs[4].prate_m_prime_lo [0x00000A44] = 0x00000191
port_prate_regs[4].prate_n_prime_lo [0x00000A48] = 0x00037E78
port_prate_regs[4].prate_m_prime_hi [0x00000A4C] = 0x00000000
port_srate_regs[0].srate_ctrl [0x00000A50] = 0x00000003
port_srate_regs[0].srate_mn [0x00000A54] = 0x004E0095
port_srate_regs[1].srate_ctrl [0x00000A58] = 0x00000003
port_srate_regs[1].srate_mn [0x00000A5C] = 0x0191032C
port_srate_regs[2].srate_ctrl [0x00000A60] = 0x00000003
port_srate_regs[2].srate_mn [0x00000A64] = 0x0191032C
port_srate_regs[3].srate_ctrl [0x00000A68] = 0x00000003
port_srate_regs[3].srate_mn [0x00000A6C] = 0x0191032C
port_srate_regs[4].srate_ctrl [0x00000A70] = 0x00000003
port_srate_regs[4].srate_mn [0x00000A74] = 0x0191032C
TW_UBR10k_34.13#

```

The following example provides information about all controllers using the **show controller integrated-cable** command and the **status** keyword:

```

Router# show controllers integrated-Cable 6/0/0 status
Load for five secs: 9%/0%; one minute: 11%; five minutes: 13%
Time source is NTP, *15:07:31.309 EDT Sun Mar 21 2010

```

Jib3-DS Status:

-----

```

Rx SPI.....: OK
Tx SPI.....: OK
DCM Status.....: OK
ERP Status.....: OK
DOCSIS RLDRAM Status: OK
QM RLDRAM Status.....: OK

```

DS PHY Device Information:

-----

```

Remora Version = 3.10
UPX SW Version = 0x10D
Upconverter Type:Unknown
UPX Part Number =

```

Device Status:

-----

```

UPX Alarm Status = 0x3FF
UPX Alarm Mask = 0x19000

```

Table 173 describes the fields displayed in the **show controller integrated-cable** command output with various keywords (as described in preceding examples).

**Table 173** *show controller integrated-cable Field Descriptions*

| Field        | Description                                      |
|--------------|--------------------------------------------------|
| WB channel   | Wideband channel number.                         |
| BG ID        | Bonding group ID.                                |
| Bundle num   | Bundle number.                                   |
| NB channel   | Narrowband channel number.                       |
| NB chan ID   | Narrowband channel ID.                           |
| Reserved CIR | Reserved committed information rate (CIR) value. |
| Total CIR    | Total committed information rate (CIR) value.    |

**Table 173** *show controller integrated-cable Field Descriptions (continued)*

| Field                | Description                                                                                                                      |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Controller Chan      | Controller channel number.                                                                                                       |
| RF Packets           | RF packets.                                                                                                                      |
| MPEG bps             | MPEG value in bps.                                                                                                               |
| MPEG mbps            | MPEG value in Mbps.                                                                                                              |
| MPEG Packets         | MPEG packets.                                                                                                                    |
| Sync Packets         | Synchronization packets.                                                                                                         |
| MAP/UCD              | MAP/ UCD value                                                                                                                   |
| Tx Packets           | Tx packets                                                                                                                       |
| Tx Octets            | Tx octets                                                                                                                        |
| Offset               | Memory offset                                                                                                                    |
| Register             | Line card registers                                                                                                              |
| Value                | Register values.                                                                                                                 |
| BPI Index            | Baseline Privacy Interface (BPI) index number.                                                                                   |
| Segment              | Hardware segment being used by DOCSIS MAC.                                                                                       |
| Even Key             | Current value of the Even Key in the BPI entry.                                                                                  |
| Odd Key              | Current value of the Odd Key in the BPI entry.                                                                                   |
| Key Sequence Number  | Key sequence number.                                                                                                             |
| Security Association | Security association identifier.                                                                                                 |
| Key Type             | The type of key stored based on the encryption algorithm (Data Encryption Standard [DES] or Advanced Encryption Standard [AES]). |

**Related Commands**

| Command                           | Description                                                                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable rf-bandwidth-percent</b> | Enables static or dynamic bandwidth sharing for a modular cable (MC) interface.                                                    |
| <b>cable upstream connector</b>   | Maps an upstream port to a physical port on the Cisco UBR-MC20X20V cable interface line card for use with a particular downstream. |
| <b>show controller cable</b>      | Displays information about the interface controllers for a cable interface on the Cisco CMTS router.                               |
| <b>show hw-module bay</b>         | Displays information about the wideband channels or RF channels on a Wideband SPA.                                                 |
| <b>show interface cable</b>       | Displays the current configuration and status of a cable interface.                                                                |

# show controllers cable

To display information about the interface controllers on a cable interface on the Cisco CMTS router, use the **show controllers cable** command in user EXEC or privileged EXEC mode.

```
show controllers cable {slot/port|slot/subslot/port} [downstream | upstream [port] | [ipc]
[mem-stat] [memory] [proc-cpu]
```

Cisco IOS Release 12.2(33)SCE and later

```
show controllers cable {slot/cable-interface-index|slot/subslot/cable-interface-index}
[downstream | upstream [upstream-index] | [ipc] [mem-stat] [memory] [proc-cpu]
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>Cisco uBR7100 series router—The valid value is 1.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary subslot of the cable interface line card. The valid slots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                               |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <b>downstream</b>            | (Optional) Displays the downstream interface status.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>upstream</b>              | (Optional) Displays the upstream interface status.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>port</i>                  | (Optional) Specifies the desired upstream port. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                                                                                                                                                                                                                                  |
| <i>upstream-index</i>        | (Optional) Specifies the desired index for the upstream port. Valid values for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards range from 0 to 3.                                                                                                                                                                                                                                                                                                                                 |
| <b>ipc</b>                   | (Optional) Displays the Inter-Process Communication (IPC) information between different line cards.                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>mem-stat</b>              | (Optional) Displays the output from the <b>show memory statistics</b> command that contains a summary of memory statistics for a Broadband Processing Engine (BPE) cable interface line card.                                                                                                                                                                                                                                                                                            |

|                 |                                                                                                                                                                                                            |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>memory</b>   | (Optional) Displays the output from the <b>show memory</b> command that contains a summary of memory statistics, including the memory as it is allocated per process, for a BPE cable interface line card. |
| <b>proc-cpu</b> | (Optional) Displays the output from the <b>show processes cpu</b> command that contains the processor status for a BPE cable interface line card.                                                          |

**Command Modes**

User EXEC, Privileged EXEC (#)

**Command History**

| Release                                     | Modification                                                                                                                                                                                                                                                                                    |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA                                     | This command was introduced.                                                                                                                                                                                                                                                                    |
| 12.0(2)XC                                   | This command was modified to show a number of additional fields.                                                                                                                                                                                                                                |
| 12.1(5)EC1                                  | Support was added for the Cisco uBR7100 series router, including information about the Cisco uBR7100 series integrated upconverter.                                                                                                                                                             |
| 12.2(1)XF1                                  | Support was added for the Cisco uBR10012 router.                                                                                                                                                                                                                                                |
| 12.0(16)SC2,<br>12.1(10)EC1,<br>12.2(4)BC1b | The algorithm for calculating the SNR value was enhanced for a more accurate value.                                                                                                                                                                                                             |
| 12.2(15)CX                                  | Support was added for the Cisco uBR-MC28U/X cable interface line card, including the display of the number of packets dropped because they were for a Service Flow ID (SFID) of 0.                                                                                                              |
| 12.2(15)BC2b                                | The <b>mem-stat</b> , <b>memory</b> , and <b>proc-cpu</b> keywords were added to obtain processor information from the onboard processor on Broadband Processing Engine (BPE) cable interface line cards, such as the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR10-MC5X20S/U cards.    |
| 12.3(9a)BC                                  | Added the optional <b>tech-support</b> keyword to optimize the collection of line card information without consuming the console session for a long period of time.                                                                                                                             |
| 12.3(17a)BC                                 | Added support for Dynamic Channel Change (DCC) for Load Balancing on the Cisco CMTS.                                                                                                                                                                                                            |
| 12.3(17a)BC2                                | Added support for the Cisco uBR10-MC5X20H interface line cards.                                                                                                                                                                                                                                 |
| 12.3(23)BC                                  | The <b>downstream</b> keyword displays status and characteristics of modular cable interfaces associated with the Cisco uBR10-MC5X20 line card MAC domain host interface.                                                                                                                       |
| 12.2(33)SCA                                 | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                              |
| 12.2(33)SCC                                 | The command output was modified to show logical channels information when multiple logical channels are configured.                                                                                                                                                                             |
| 12.2(33)SCE                                 | The command syntax was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. The upstream <i>port</i> parameter was changed to <i>upstream-index</i> . |

**Usage Guidelines**

The **mem-stat**, **memory**, and **proc-cpu** keywords are used to obtain the relevant information from the onboard processor on BPE cable interface line cards, such as the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR10-MC5X20S/U/H cards. This allows you to obtain information that is specific to a line card, as opposed to having to run these commands on the entire router.

The *logical-index* is shown only when multiple logical channels are configured using the **cable upstream max-logical-chans** command.

**Note**

The **mem-stat**, **memory**, and **proc-cpu** options are not available for cable interface line cards that do not contain an onboard processor (for example, the Cisco uBR-MC16C card).

**Dynamic Channel Change (DCC) Support for Load Balancing**

The following commands and fields illustrate the **show controllers** command used with DCC:

```
Router# show controllers cable x/y upstream | i DCC

DCC: 0 REQs n2 RSPs 0 ACKs
Router# show controllers cx/y downstream | i DCC
DCC: n1 REQs 0 RSPs n3 ACKs
n4 Successful DCCs n5 DCC Failures
DCC end of transaction counts:
DCC unknown cause(e1) offline(e2) if down(e3) no cm(e4)
DCC no resource(e5) no retries(e6) reject(e7) unknown state (e8)
DCC rebuild err (e9) T15 timeout(e10) reinit MAC (e11) dcc succeeds(e12)
```

The fields in this example are as follows:

- n1—The number of DCC REQ messages traversing an interface, nonzero on downstream.
- n2—The number of DCC RSP messages traversing an interface, nonzero on upstream.
- n3—The number of DCC ACK messages traversing an interface, nonzero on downstream.
- n4—The number of successful DCC transactions, nonzero on downstream direction.
- n5—The number of failed DCC transactions, nonzero only on downstream direction

The above counters are DOCSIS-specific DCC counters, which can also be collected via SNMP MIB.

The following summary illustrates classified DCC transaction end counts originated from the interface with the above **show controllers** command example:

- e1—The number of DCC transactions ended with unknown causes.
- e2—The number of DCC transactions ended due to modems going offline.
- e3—The number of DCC transactions ended due to interface down.
- e4—The number of DCC transactions ended due to a nonexistent cable modem.
- e5—The number of DCC transactions ended due to insufficient resources on target.
- e6—The number of DCC transactions ended due to exhausted DCC-REQ retries.
- e7—The number of DCC transactions ended due to rejected DCC-REQ.
- e8—The number of DCC transactions ended due to unknown DCC state.
- e9—The number of DCC transactions ended due to failure to assign a cable modem on the target.
- e10—The number of DCC transactions ended due to T15 time out.
- e11—The number of DCC transactions ended due to CM MAC reinitialization.
- e12—The number of DCC transactions ended successfully.

This command is subject to the restrictions and prerequisites described in the *Configuring Load Balancing and Dynamic Channel Change (DCC) on the Cisco CMTS* feature guide on Cisco.com.



**Examples**

The following abbreviated example illustrates the initial information for the **tech-support** keyword for the Cisco uBR10012 router on which Cisco IOS Release 12.3(9a)BC is installed:

```
Router# show controllers cable 8/1/0 tech-support

----- show version -----

Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (UBR10KCLC-LC-M), Experimental Version 12.3(20040708:1441
55) [bguckel-geo_cable-12 102]
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled Mon 19-Oct-04 11:28 by bguckel
Image text-base: 0x60008EB8, data-base: 0x60CB0000

ROM: System Bootstrap, Version 12.2(20011031:221132) [maheshj-cr10k-rommon 15],
DEVELOPMENT SOFTWARE
BOOTLDR: 7200 Software (UBR10KCLC-LC-M), Experimental Version 12.2(20011107:2331
03) [janez-v122_2_xf_throttle.Nov5A 101]

clc_8_1 uptime is 1 week, 9 hours, 54 minutes
System returned to ROM by power-on
System restarted at 08:59:44 UTC Wed Jul 21 2004
Running default software

cisco uBR10K CLC (NPE-CLC) processor (revision A) with 196608K/65536K bytes of m
emory.
Processor board ID
R7000 CPU at 262MHz, Implementation 39, Rev 2.1, 256KB L2 Cache
6 slot midplane, Version 1.0
.
```

The following is a sample output of the **show controllers cable downstream** command for downstream connection at slot 3 on a Cisco CMTS router:

```
Router# show controllers cable 3/0 downstream

Cable 3/0 Downstream is up
Frequency not set, Channel Width 6 MHz, 64-QAM, Symbol Rate 5.056941 Msps
FEC ITU-T J.83 Annex A, R/S Interleave I=12, J=17
```

[Table 174](#) describes the fields shown in the **show controllers cable downstream** command display.

**Table 174** *show controllers cable downstream Field Descriptions*

| Field              | Description                                                                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable              | Slot and port number indicating the location of the Cisco cable interface line card.                                                                                                          |
| Downstream is up   | RF downstream interface is enabled.                                                                                                                                                           |
| Frequency          | Transmission frequency of the RF downstream. (This information may not match the current transmission frequency, which is external on Cisco CMTS platforms that use an external upconverter.) |
| Channel Width      | Width of the RF downstream channel.                                                                                                                                                           |
| QAM                | Modulation scheme.                                                                                                                                                                            |
| Symbol Rate        | Transmission rate (in number of symbols per second).                                                                                                                                          |
| FEC ITU-T          | Motion Picture Experts Group (MPEG) framing standard.                                                                                                                                         |
| Annex              | Annex for the RF downstream channel.                                                                                                                                                          |
| R/S Interleave I/J | Reed Solomon framing based on ITU S.83-B.                                                                                                                                                     |

For cable interfaces that include an integrated upconverter, the **show controllers cable** command includes the frequency and power settings for the integrated upconverter. The following example shows a typical output for the **show controllers cable** command that includes the information for the integrated upconverter:

```
Router# show controllers cable 1/0

Interface Cable1/0
Hardware is IMC11
BCM3210 revision=0x56B2
Cable1/0 Upconverter is Enabled Output is Enabled
Model: 74-2094-01 Serial Number: 0WAV04480010 CLEI Code: CLEI#
HW Rev: PC2D0107 SW Rev: 007, NVRAM Rev: 006 ECI number 123456
Downstream Frequency 525.0000 MHz
IF Power 0.3 dBmv RF Power 51.0 dBmv
...
```

The following example is a sample output of the **show controllers cable** command with the cable interface index 0, on the Cisco UBR-MC3XG60V line card. The downstream channel ID and RFID are also displayed in the output:

```
Router# show controller cable 5/0/0

Interface Cable5/0/0
Hardware is M3G60

HCCP HA FLAGS:
 linestate: TRUE hccp_if_initiated: FALSE hccp_hready: TRUE
 hccp_heartbeat: FALSE hccp_critical: FALSE ha_critical: FALSE
 drop_mac_msgs: FALSE current_active_segment: 0

HCCP HA UPStream FLAGS:
 US 1 first_time_up: FALSE US 2 first_time_up: TRUE
 US 3 first_time_up: TRUE US 4 first_time_up: TRUE

JIB Base: 0x20000000, JIB Revision: 0x00000002, Release: 0x00000033

Cable5/0/0 JIB hardware status:

 JIB Downstream port Enabled

 JIB Upstream port 0 Enabled
 JIB Upstream port 1 Disabled
 JIB Upstream port 2 Disabled
 JIB Upstream port 3 Disabled

JIB CURRENT ACTIVE BPI/PHS Segment: DS: 0 US: 0
S/W CURRENT ACTIVE BPI/PHS Segment: 0

H/W Spectrum Management Information:
 Sextant FPGA Revision: 0x1B
 FFT Transform Revision: 0x2
 IRQ status 0x0, IRQ mask 0x1F
 time_stamp_lsb 0x739D, time_stamp_msb 0xB8D3
 time_stamp_gen_csr 0x100
 FFT Engine State: 1, Busy Count: 0, Wrong State Count: 0
 FFT Device Trigger Time Miss Count: 0
 FFT Device Sample Overflow: 0, Transform Overflow: 0
 FFT Device TSRM Parity: 0, TSRM/TSG Comparison Error: 0, TSG Reload: 1

Upconverter: vcom
Cable5/0/0 Upconverter is Disabled Output is Disabled
Model: 74-3153-05 Serial Number: 0WAV10250089
```

```

HW Rev: PC2D0109 SW Rev: 204, NVRAM Rev: 021 ECI number FFFFFF
Downstream Frequency 537.0000 MHz
RF Power Disabled

idb 0x6565E520 MAC regs 0x20000000 SDRAM 0x28000000
mac ring entries 32 bandwidth ring entries 128 tx ring entries 128 MAP tx ri
entries 128
MAC ring 0xC7A7E00 shadow 0x65745D08 head 8 count 1136840 full 0
Bandwidth ring 0xC7A7EC0 shadow 0x65745E08 head 61 count 189 full 0
PCI low priority ring 0xC7A8100 shadow 0x65746088 head 19 count 19 full 0
US CCF ring 0xC7A8340 shadow 0x65746308 head 0 count 0 full 0
FIB ring 0xC7A87C0 shadow 0x65746808 head 0 count 0 full 0
IPC packets received 0
Drops: Par 0 CRC 0 Len 0
Force Drops IPC 0 Lo/Hi 0/0, 0/0
snfr_fibipc_dmastatus 0x0
Sniffer ring 0xC7A8580 shadow 0x65746588 head 0 count 0 full 0
High priority Tx ring 0xC7A7140 shadow 0x65744388 head 6 tail 8 count 2 full
Low priority Tx ring 0xC7A6D00 shadow 0x65743B08 head 0 tail 0 count 0 full
TiB Tx ring 0xC7A7580 shadow 0x65744C08 head 105 tail 105 count 0 full 0 stu
0
PCCF Tx ring 0xC7A79C0 shadow 0x65745488 head 0 tail 0 count 0 full 0 stuck
JIB SDRAM Correctable ECC Count: 0
 SDRAM_CECC_INFO_REG_0: 0x0, SDRAM_CECC_INFO_REG_1: 0x0
JIB SSRAM Correctable ECC Count: 0
JIB Timestamp Mismatch Count: 0
JIB Timestamp Reload Count: 0
Timestamp is from TCC card
throttled 0 enabled 0 disabled 0
Rx: spurious 0 framing_err 0 hcs_err 0 no_buffer 0 short_pkt 0
 no_enqueue 0 no_enp 0 miss_count 0 latency 0
 invalid_sid 0 invalid_mac 0 bad_ext_hdr_pdu 0 concat 0 bad-concat 0
Tx: full 0 drop 0 stuck 0 latency 0
MTx: full 0 drop 0 stuck 0 latency 0
Slots 0 NoUWCollNoEngy 0 FECorHCS 0 HCS 0
Req 186 ReqColl 0 ReqNoise 0 ReqNoEnergy 2198449112
ReqData 0 ReqDataColl 0 ReqDataNoise 0 ReqDataNoEnergy 0
Rng 1136720 RngColl 0 RngNoise 0
FECBlks 1137342 UnCorFECBlks 0 CorFECBlks 0
MAP FIFO overflow 0, Rx FIFO overflow 0, No rx buf 0
DS FIFO overflow 0, US FIFO overflow 0, US stuck 0
Bandwidth Requests= 0xBA
Piggyback Requests= 0x3
Ranging Requests= 0x115852
Timing Offset = 0x0
Master Clock Timestamp = 0xB8D5DBCD
Bad bandwidth Requests= 0x0
Bad REG_ACK= 0x0
No REG_RESP buffer= 0x0
Cable5/0/0 Downstream is up
Frequency 537.0000 MHz, Channel Width 6 MHz, 64-QAM, Symbol Rate 5.056941 M
FEC ITU-T J.83 Annex B, R/S Interleave I=32, J=4
Downstream channel ID: 255
Dynamic Services Stats (All Downstreams):
DSA: 0 REQs 0 RSPs 0 ACKs
0 Successful DSAs 0 DSA Failures
DSC: 0 REQs 0 RSPs 0 ACKs
0 Successful DSCs 0 DSC Failures
DSD: 0 REQs 0 RSPs
0 Successful DSDs 0 DSD Failures
DBC: 0 REQs 0 RSPs(Rcvd) 0 ACKs
0 Successful DBCs 0 DBC Failures 0 DBC Partial
0 DBC Protocol Violations
DCC: 0 REQs 0 RSPs 0 ACKs

```

## ■ show controllers cable

```

0 Successful DCCs 0 DCC Failures
0 DCC Departs 0 DCC Arrives
DCC end of transaction counts:
DCC unknown cause(0) offline(0) if down(0) no cm(0)
DCC no resource(0) no retries(0) reject(0) unknown state (0)
DCC rebuild err (0) T15 timeout(0) wrong channel(0) reinit MAC (0)
DCC dcc succeeds(0)
DCC wcm(0)
CM STATUS Stats:
0 invalid_event 0 tlv_error
0 disabled_event 0 invalid_state
0 invalid_chid 0 prim_chid
Local total modems 0, modems active 0, total DS flows 2
NB_DS Mo1/1/0:0, STATE: UP
Frequency 55.0000 MHz 256-QAM, ANNEX B, R/S Interleave I=32, J=4
Network Delay 550 (usec)
Bandwidth (Kbps): 13800, Load Percent: 0
Channel ID: 193, US MAP: 0x0001
Total modems: 2, modems active : 2, total DS flows: 3
NB_DS Cable5/0/0, STATE: DOWN
Frequency 537.0000 MHz 64-QAM, ANNEX B, R/S Interleave I=32, J=4
Network Delay 0 (usec)
Bandwidth (Kbps): 20800, Load Percent: 0
Channel ID: 255, US MAP: 0x000F

// Output displaying the DS_chan_id and RFID IDs//
DS_chan_id RFID Interface

193 24 Mo1/1/0:0

MDDs Primary Non-Primary

1/1/0:0 582033 0
1/1/0:1 0 582030

..
...
```

The following is a sample output of the **show controllers cable downstream** command for a downstream on the Cisco uBR-MC28U cable interface line card or a cable interface line card with integrated upconverter:

```
Router# show controllers cable 6/0 downstream
```

```

Interface Cable6/0
Hardware is MC28U (F-connector) with Integrated Up-converter
Primary rommon version is: 11.4
Secondary rommon version is: 6553.5
Current rommon is Primary
Late input drops = 0
Output queue: 0/1000/64/0 (size/max total/threshold/drops)
JIB version 372
H/W Spectrum Management Information:
 BCM3138 Chip State: 1 1 1 1, Serial Port State 1, Busy Count: 0 25 0 0
Spectrum Management IPC Statistics:
Tx Statistics
 Pkts: 48413, Lock Errs: 0, MB not Empty: 0, No Buffs: 0
Rx Statistics
 Pkts: 46097, Timeout: 1, Unexpected: 0, No Buffs: 0, Lock Errs: 0
Inuse band lower=0 upper=0 CNR=56
candidate band lower=0 upper=0 Mod=0
Inuse band lower=0 upper=0 CNR=52
candidate band lower=0 upper=0 Mod=0
```

```

Inuse band lower=0 upper=0 CNR=55
candidate band lower=0 upper=0 Mod=0
Inuse band lower=23000 upper=26200 CNR=55
candidate band lower=23000 upper=26200 Mod=0
Cable6/0 Upconverter is Enabled Output is Enabled
Model: 74-2094-05 Serial Number: 0WAV06530029 CLEI Code: FFFFFFFF
HW Rev: PC2D0108 SW Rev: 010, NVRAM Rev: 006 ECI number FFFFFF
Downstream Frequency 471.0000 MHz
RF Power 54.9 dBmV

```

The following is a sample output of the **show controllers cable downstream** command for the cable interface line card on slot 8, subslot 0, and port 0 on a Cisco CMTS router:

Router# **show controllers cable 8/0/0 downstream**

```

Cable8/0/0 Downstream is up
Frequency 453.0000 MHz, Channel Width 6 MHz, 64-QAM, Symbol Rate 5.056941 Msps
FEC ITU-T J.83 Annex B, R/S Interleave I=32, J=4
Downstream channel ID: 191
Dynamic Services Stats:
DSA: 0 REQs 0 RSPs 0 ACKs
0 Successful DSAs 0 DSA Failures
DSC: 0 REQs 0 RSPs 0 ACKs
0 Successful DSCs 0 DSC Failures
DSD: 0 REQs 0 RSPs
0 Successful DSDs 0 DSD Failures
DCC: 0 REQs 0 RSPs 0 ACKs
0 Successful DCCs 0 DCC Failures
DCC end of transaction counts:
DCC unknown cause(0) offline(0) if down(0) no cm(0)
DCC no resource(0) no retries(0) reject(0) unknown state (0)
DCC rebuild err (0) T15 timeout(0) wrong channel(0) reinit MAC (0)
DCC dcc succeeds(0)
DCC wcm(0)
Local total modems 800, modems active 800, total DS flows 801
NB DS Mo3/0/1:0, STATE: UP
Frequency 555.0000 MHz 64-QAM, ANNEX B, R/S Interleave I=32, J=4
Network Delay 550 (usec)
Bandwidth (Kbps): 4315, Load Percent: 0
Channel ID: 48, US MAP: 0x0037
Total modems: 4, modems active : 4, total DS flows: 5
NB DS Mo3/0/1:1, STATE: UP
Frequency 561.0000 MHz 64-QAM, ANNEX B, R/S Interleave I=32, J=4
Network Delay 550 (usec)
Bandwidth (Kbps): 4315, Load Percent: 0
Channel ID: 49, US MAP: 0x0037
Total modems: 2, modems active : 2, total DS flows: 3
NB DS Mo3/0/1:2, STATE: UP
Frequency 567.0000 MHz 64-QAM, ANNEX B, R/S Interleave I=32, J=4
Network Delay 550 (usec)
Bandwidth (Kbps): 4315, Load Percent: 0
Channel ID: 50, US MAP: 0x0037
Total modems: 1, modems active : 1, total DS flows: 2
NB DS Mo3/0/1:3, STATE: UP
Frequency 573.0000 MHz 64-QAM, ANNEX B, R/S Interleave I=32, J=4
Network Delay 550 (usec)
Bandwidth (Kbps): 13485, Load Percent: 0
Channel ID: 51, US MAP: 0x0037
Total modems: 3, modems active : 3, total DS flows: 4

```

The following example is a sample output of the **show controllers cable downstream** command for the Cisco uBR-MC3GX60V line card sharing downstreams with the Cisco Wideband SPA, in Cisco IOS Release 12.2(33)SCG:

## ■ show controllers cable

Router# **show controllers cable 8/0/0 downstream**

```
Dynamic Services Stats (All Downstreams):
DSA: 0 REQs 0 RSPs 0 ACKs
0 Successful DSAs 0 DSA Failures
DSC: 0 REQs 0 RSPs 0 ACKs
0 Successful DSCs 0 DSC Failures
DSD: 0 REQs 29 RSPs
0 Successful DSDs 0 DSD Failures
DBC: 0 REQs 96 RSPs(Rcvd) 0 ACKs
0 Successful DBCs 0 DBC Failures 0 DBC Partial
96 DBC Protocol Violations
0 Total DBC Pending Q-Size
DCC: 0 REQs 0 RSPs 0 ACKs
0 Successful DCCs 0 DCC Failures
0 DCC Departs 0 DCC Arrives
DCC end of transaction counts:
DCC unknown cause(0) offline(0) if down(0) no cm(0)
DCC no resource(0) no retries(0) reject(0) unknown state (0)
DCC rebuild err (0) T15 timeout(0) wrong channel(0) reinit MAC (0)
DCC dcc succeeds(0)
DCC wcm(0)
CM STATUS Stats:
0 invalid_event 4 tlv_error
0 disabled_event 598985 invalid_state
0 invalid_chid 0 prim_chid
Local total modems 0, modems active 0, total DS flows 3
NB DS Mo1/1/0:0, STATE: UP
Frequency 699.0000 MHz 256-QAM, ANNEX B, R/S Interleave I=32, J=4
Network Delay 550 (usec)
Bandwidth (Kbps): 6000, Load Percent: 0
Channel ID: 5, US MAP: 0x000F
Total modems: 51, modems active : 37, total DS flows: 158
```

```
DS_chan_id RFID Interface

```

```
5 24 Mo1/1/0:0

```

| MDDs    | Primary | Non-Primary |
|---------|---------|-------------|
| 1/1/0:0 | 1148012 | 0           |
| 1/1/0:1 | 0       | 1148011     |
| 1/1/0:2 | 0       | 1148011     |
| 1/1/0:3 | 0       | 1148011     |
| 1/3/0:0 | 0       | 1148011     |
| 1/3/0:1 | 0       | 1148011     |
| 1/3/0:2 | 0       | 1148011     |
| 1/3/0:3 | 0       | 1148011     |
| 7/0/0:0 | 0       | 1148011     |
| 7/0/0:1 | 0       | 1148011     |
| 7/0/0:2 | 0       | 1148011     |
| 7/0/0:3 | 0       | 1148011     |
| 8/0/2:0 | 0       | 1148011     |
| 8/0/2:1 | 0       | 1148011     |
| 8/0/2:2 | 0       | 1148011     |
| 8/0/2:3 | 0       | 1148011     |

Table 175 describes the fields shown in the **show controllers cable downstream** command display.

**Table 175** *show controllers cable downstream Field Descriptions*

| Field                  | Description                                                                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Downstream Frequency   | Center frequency (in MHz) for which the integrated upconverter is configured.                                                                           |
| IF Power               | Power level (in dBmV) of the signal that the integrated upconverter is receiving from the cable interface line card in the Cisco uBR7100 series router. |
| RF Power               | Power level (in dBmV) of the RF output signal that the integrated upconverter is transmitting on the DS0 RF port.                                       |
| Dynamic Services Stats | Dynamic downstream service statistics for a specific cable interface.                                                                                   |
| CM STATUS Stats        | Cable modem status statistics for a specific cable interface.                                                                                           |
| DS_chan_id             | Downstream channel ID for a specific cable interface.                                                                                                   |
| RFID                   | RF ID associated to a specific cable interface.                                                                                                         |
| MDDs                   | MAC Domain Descriptor (MDD).                                                                                                                            |
| Primary                | Primary MDD.                                                                                                                                            |
| Non-Primary            | Non-primary MDD.                                                                                                                                        |

The following is sample output from the **show controllers cable upstream** command for a Cisco CMTS router with a cable interface line card located in slot 4, port 0:

```
Router# show controllers cable 4/0 upstream 2
```

```
Cable4/0 Upstream 2 is administratively down
 Frequency 5.008 MHz, Channel Width 0.200 MHz, QPSK Symbol Rate 0.160 Msps
 Spectrum Group 4
 SNR measurement - 27.2340 dB
 Nominal Input Power Level 5 dBmV, Tx Timing Offset 0
 Ranging Backoff Start 16, Ranging Backoff End 16, Tx Backoff Start 16
 Tx Backoff End 16, Modulation Profile Group 1
 part_id=0x3137, rev_id=0x01, rev2_id=0xFF
 nb_agc_thr=0x0000, nb_agc_nom=0x0000
 Range Load Reg Size=0x58
 Request Load Reg Size=0x0E
 Minislot Size in number of Timebase Ticks is = 8
 Minislot Size in Symbols =8
 Bandwidth Requests = 0x0
 Piggyback Requests = 0x0
 Invalid BW Requests= 0x0
 Minislots Requested= 0x0
 Minislots Granted = 0x0
 Minislot Size in Bytes = 2
 UCD Count = 0
 DES Ctrl Reg#0 = C00C0C43, Reg#1 = 0
```

```
Router#
```

The following example shows a sample output of the **show controllers cable upstream** command for a cable interface line card with *upstream-index* 0:

```
Router# show controller cable 5/0/0 upstream 0
```

```
Cable5/0/0 Upstream 0 is up
 Frequency 15.000 MHz, Channel Width 1.600 MHz, Symbol Rate 1.280 Msps
 Modulations (QPSK) - Short QPSK, Long QPSK
 Mapped to non-shared connector 0 and receiver 0 //Output displaying the connector and
receiver used by the upstream channel //
 Spectrum Group is overridden
 US phy MER(SNR)_estimate for good packets - 31.5968 dB
 Nominal Input Power Level 0 dBmV, Tx Timing Offset 2000
 Ranging Backoff Start 3, Ranging Backoff End 6
 US timing offset adjustment type 2, value 505
 Ranging Insertion Interval automatic (60 ms)
 US throttling off
 Tx Backoff Start 3, Tx Backoff End 5
 Modulation Profile Group 21
 Concatenation is enabled
 Fragmentation is enabled
 part_id=0x0952, rev_id=0x00, rev2_id=0x00
 nb_agc_thr=0x0000, nb_agc_nom=0x0000
 Range Load Reg Size=0x58
 Request Load Reg Size=0x0E
 Minislot Size in number of Timebase Ticks is = 4
 Minislot Size in Symbols = 32
 Bandwidth Requests = 0xBC
 Piggyback Requests = 0x3
 Invalid BW Requests= 0x0
```

The following example shows a typical output of the **show controllers cable upstream** command for a cable interface line card that includes onboard hardware-based spectrum management capabilities:

```
Router# show controllers cable 3/0 upstream 3
```



```

Cable6/0 Upstream 3 is up
 Frequency 24.600 MHz, Channel Width 3.200 MHz, 64-QAM Symbol Rate 2.560 Msps
 This upstream is mapped to physical port 3
 Spectrum Group 14, Last Frequency Hop Data Error: NO(0)
 MC28U CNR measurement - better than 50 db
 Nominal Input Power Level 0 dBmV, Tx Timing Offset 2815
 Ranging Backoff automatic (Start 0, End 3)
 Ranging Insertion Interval automatic (60 ms)
 Tx Backoff Start 0, Tx Backoff End 4
 Modulation Profile Group 241
 Concatenation is enabled
 Fragmentation is enabled
 part_id=0x3138, rev_id=0x02, rev2_id=0x00
 nb_agc_thr=0x0000, nb_agc_nom=0x0000
 Range Load Reg Size=0x58
 Request Load Reg Size=0x0E
 Minislot Size in number of Timebase Ticks is = 2
 Minislot Size in Symbols = 32
 Bandwidth Requests = 0x23C800
 Piggyback Requests = 0x489FB8
 Invalid BW Requests= 0x0
 Minislots Requested= 0x4499EBE
 Minislots Granted = 0x6C67B7
 Minislot Size in Bytes = 24
 Map Advance (Dynamic) : 2454 usecs
 UCD Count = 429798
 ATDMA mode enabled
Multicast/Broadcast RateLimit Dropped Pkts : 0

```

The following example shows a typical output of the **show controllers cable upstream** command for the Cisco uBR10-MC5X20H cable interface line card that is configured with multiple logical channels:

```
Router# show controllers cable 7/1/0 upstream 0
```

```

Cable7/1/0 Upstream 0 is up
 Frequency 30.000 MHz, Channel Width 1.600 MHz, Symbol Rate 1.280 Msps
 Modulations - Short QPSK, Long QPSK
 This upstream is mapped to physical port 0
 Spectrum Group is overridden
 US phy MER(SNR)_estimate for good packets - 30.2024 dB
 Nominal Input Power Level 3 dBmV, Tx Timing Offset 1419
 Ranging Backoff Start 0, Ranging Backoff End 1
 US timing offset adjustment type 0, value 0
 Ranging Insertion Interval automatic (60 ms)
 US throttling off
 Tx Backoff Start 3, Tx Backoff End 5
 Modulation Profile Group 21
 Concatenation is disabled
 Fragmentation is enabled
 part_id=0x3140, rev_id=0x03, rev2_id=0x00
 nb_agc_thr=0x0000, nb_agc_nom=0x0000
 Range Load Reg Size=0x58
 Request Load Reg Size=0x0E
 Minislot Size in number of Timebase Ticks is = 4
 Minislot Size in Symbols = 32
 Bandwidth Requests = 0x25
 Piggyback Requests = 0x3
 Invalid BW Requests= 0x0
 Minislots Requested= 0x5B4
 Minislots Granted = 0x28
 Minislot Size in Bytes = 8
 Map Advance (Dynamic) : 2418 usecs
 Map Count = 11744156
 Remote Map Counts: (none)

```

```

UCD Count = 12067
Remote UCD Counts: (none)
PHY: us errors 0 us recoveries 0
MAC PHY TSS: tss error start 0 tss error end 0
MAC PHY Status: bcm3140 status 0 lookout status 0
MAP/UCD Replication Instructions:
Cable7/1/0 Upstream 8 is administratively down
Frequency 30.000 MHz, Channel Width 1.600 MHz, Symbol Rate 1.280 Msps
Modulations - Short QPSK, Long QPSK
This upstream is mapped to physical port 0
Spectrum Group is overridden
MER(SNR) - Unknown - no modems online.
Nominal Input Power Level 3 dBmV, Tx Timing Offset 0
Ranging Backoff Start 3, Ranging Backoff End 6
US timing offset adjustment type 0, value 0
Ranging Insertion Interval automatic (60 ms)
US throttling off
Tx Backoff Start 3, Tx Backoff End 5
Modulation Profile Group 21
Concatenation is disabled
Fragmentation is enabled
part_id=0x3140, rev_id=0x03, rev2_id=0x00
nb_agc_thr=0x0000, nb_agc_nom=0x0000
Range Load Reg Size=0x58
Request Load Reg Size=0x0E
Minislot Size in number of Timebase Ticks is = 4
Minislot Size in Symbols = 32
Bandwidth Requests = 0x0
Piggyback Requests = 0x0
Invalid BW Requests= 0x0
Minislots Requested= 0x0
Minislots Granted = 0x0
Minislot Size in Bytes = 8
Map Advance (Dynamic) : 2280 usecs
Map Count = 0
Remote Map Counts: (none)
UCD Count = 0
Remote UCD Counts: (none)
PHY: us errors 0 us recoveries 0
MAC PHY TSS: tss error start 0 tss error end 0
MAC PHY Status: bcm3140 status 0 lookout status 0
MAP/UCD Replication Instructions:

```

For Broadband Processing Engine (BPE) cards and other cable interfaces that include onboard upconverters, the **show controllers cable** command also displays the upconverter status and configuration information. The following excerpt from the **show controllers cable** command output shows the information that is displayed for the Cisco uBR10-MC5X20S cable interface line card:

```

Router# show controllers cable 5/1/4

Interface Cable5/1/4
Hardware is MC520S
JIB version 66
Cable5/1/4 Upconverter is Enabled Output is Enabled
Model: 74-2094-04 Serial Number: 0WAV0649000L CLEI Code: FFFFFFFF
HW Rev: PC2D0108 SW Rev: 010, NVRAM Rev: 006 ECI number FFFFFF
Downstream Frequency 255.0000 MHz
RF Power 49.8 dBmV

...

```

The following example is a sample output of the **show controllers cable upstream** command for the Cisco uBR-MC3GX60V line card sharing downstreams with the Cisco Wideband SPA, in Cisco IOS Release 12.2(33)SCG:

```
Router# show controllers cable 8/0/0 upstream

Cable8/0/0 Upstream 0 is up
 Frequency 15.000 MHz, Channel Width 0.800 MHz, Symbol Rate 0.640 Msps
 Modulations (16-QAM) - Short 16-QAM, Long 16-QAM
 Mapped to shared connector 0 and receiver 0
 Spectrum Group is overridden
 US phy MER(SNR)_estimate for good packets - 36.1280 dB
 Nominal Input Power Level -4 dBmV, Tx Timing Offset 5734
 Ranging Backoff Start 3, Ranging Backoff End 6
 US timing offset adjustment type 0, value 0
 Ranging Insertion Interval automatic (60 ms)
 US throttling off
 Tx Backoff Start 3, Tx Backoff End 5
 Modulation Profile Group 21
 Concatenation is enabled
 Fragmentation is enabled
 part_id=0x3142, rev_id=0xB1, rev2_id=0x00
 nb_agc_thr=0x0000, nb_agc_nom=0x0000
 Range Load Reg Size=0x58
 Request Load Reg Size=0x0E
 Minislot Size in number of Timebase Ticks is = 8
 Minislot Size in Symbols = 32
 Bandwidth Requests = 0xC7957
 Piggyback Requests = 0x19899
 Invalid BW Requests= 0x4BF
 Minislots Requested= 0xF2E365
 Minislots Granted = 0xE240A
 Minislot Size in Bytes = 16
 Map Advance (Dynamic) : 3389 usecs
 Map Count Internal = 1134448325
 No MAP buffer= 0x0 No Remote MAP buffer= 0x0
 Map Counts: Controller 1/1/0 = 1134446105
 UCD Counts:
 Controller 1/1/0:0 = 1150386

 UCD procedures on lch 0
 UCD ucd-succeeds(2) ucd-shut(0) init-state-err(0)
 UCD init-tss-err(0) init-timeout(0) init-start-err(0)
 UCD ucd-ccc-time(0) ucd-timeout(0) ucd-tss-err(0)
 UCD ucd-state-err(0) ucd-process(0) ucd-retries(0)
 UCD stale-tss(0)
 PHY: us errors 0 us recoveries 0 (enp 0)
 MAC PHY TSS: tss error start 0 tss error end 0
 MAC PHY Status: bcm3140 status 0 lookout status 0
 PHY: TSS late 0 discontinuous 0
 PHY: TSS mis-match 0 not-aligned 0
 PHY: TSS missed snapshots from phy 0
 MAP/UCD Replication Instructions:
 Controller 1/1/0 index = 361, bitmap = 0x0001
Cable8/0/0 Upstream 1 is up
 Frequency 16.000 MHz, Channel Width 0.800 MHz, Symbol Rate 0.640 Msps
 Modulations (16-QAM) - Short 16-QAM, Long 16-QAM
 Mapped to shared connector 0 and receiver 1
 Spectrum Group is overridden
 US phy MER(SNR)_estimate for good packets - 36.1280 dB
 Nominal Input Power Level -4 dBmV, Tx Timing Offset 2330
 Ranging Backoff Start 3, Ranging Backoff End 6
 US timing offset adjustment type 0, value 0
```

## show controllers cable

```

Ranging Insertion Interval automatic (60 ms)
US throttling off
Tx Backoff Start 3, Tx Backoff End 5
Modulation Profile Group 21
Concatenation is enabled
Fragmentation is enabled
part_id=0x3142, rev_id=0xB1, rev2_id=0x00
nb_agc_thr=0x0000, nb_agc_nom=0x0000
Range Load Reg Size=0x58
Request Load Reg Size=0x0E
Minislot Size in number of Timebase Ticks is = 8
Minislot Size in Symbols = 32
Bandwidth Requests = 0xC0BFF
Piggyback Requests = 0x18BFB
Invalid BW Requests= 0x1B248
Minislots Requested= 0xE50E2A
Minislots Granted = 0xDA909
Minislot Size in Bytes = 16
Map Advance (Dynamic) : 3057 usecs
Map Count Internal = 1134268243
No MAP buffer= 0x0 No Remote MAP buffer= 0x0
Map Counts: Controller 1/1/0 = 1134266034
UCD Counts:
 Controller 1/1/0:0 = 1150386

UCD procedures on lch 0
UCD ucd-succeeds(2) ucd-shut(0) init-state-err(0)
UCD init-tss-err(0) init-timeout(0) init-start-err(0)
UCD ucd-ccc-time(0) ucd-timeout(0) ucd-tss-err(0)
UCD ucd-state-err(0) ucd-process(0) ucd-retries(0)
UCD stale-tss(0)
PHY: us errors 0 us recoveries 0 (enp 0)
MAC PHY TSS: tss error start 0 tss error end 0
MAC PHY Status: bcm3140 status 0 lookout status 0
PHY: TSS late 0 discontinuous 0
PHY: TSS mis-match 0 not-aligned 0
PHY: TSS missed snapshots from phy 0
MAP/UCD Replication Instructions:
 Controller 1/1/0 index = 362, bitmap = 0x0001
....

```

Table 176 describes the fields shown in the **show controllers cable upstream** command display.

**Table 176** *show controllers cable upstream Field Descriptions*

| Field                                | Description                                                                          |
|--------------------------------------|--------------------------------------------------------------------------------------|
| Cable                                | Slot and port number indicating the location of the Cisco cable interface line card. |
| Upstream is up/administratively down | Administrative state of the upstream (whether it is shutdown or not).                |
| Channel Width                        | Width of the RF upstream channel.                                                    |
| QPSK Symbol Rate                     | Modulation technique for upstream transmission.                                      |
| Spectrum Group 4                     | Spectrum group associated with this slot and port.                                   |

Table 176 *show controllers cable upstream Field Descriptions (continued)*

| Field                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency                   | <p>Transmission frequency of the RF upstream channel.</p> <p><b>Note</b> Cisco cable interface line cards always program the upstream center frequency in 16 KHz increments. This is the frequency displayed in the router configuration and the <b>show controllers cable upstream</b> command. For example, if you use the <b>cable upstream frequency</b> command to specify a center frequency of 27 MHz, the actual center frequency will be 27.008 MHz, which is the next highest 16 KHz boundary.</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| Modulations                 | Spectrum group associated with this slot and port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| SNR measurement             | <p>Estimate for the overall signal-to-noise ratio (SNR) for cable interfaces that do not include onboard hardware-based spectrum management. For most cable interface line cards, this value reflects the modulation error rate (MER) value for the upstream (as calculated according to the IEEE 802.14 PHY layer specifications). The MER is sometimes incorrectly referred to as the carrier-to-noise ratio (CNR), and the SNR value is generally lower than the CNR value.</p> <p><b>Note</b> In Cisco IOS Release 12.1(10)EC1 and Cisco IOS Release 12.2(4)BC1b, the algorithm for calculating the SNR estimate was refined for a more accurate value. Depending on the plant characteristics, the new SNR estimate could be up to 6 dB lower than the values shown in earlier software releases. This value is only an estimate—for the most accurate value, use a spectrum analyzer.</p> |
| <card-name> CNR measurement | <p>Estimate for the overall carrier-to-noise ratio (CNR) for the upstream on cable interfaces that include onboard hardware-based spectrum management. When the CNR measurement exceeds 40 dB, this line states “better than 40 dB.” As a general rule, the CNR is greater than the SNR value.</p> <p><b>Note</b> This value is only an estimate—for the most accurate value, use a spectrum analyzer or use the <b>show controllers cable upstream spectrum</b> command. For individual cable modems, you can also use the <b>show cable modem cnr</b> command.</p>                                                                                                                                                                                                                                                                                                                            |
| Nominal Input Power level   | Desired power level coming into the receiver.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Tx Timing Offset            | Largest ranging offset reported by CMs on the upstream.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Ranging Backoff Start/End   | Ranging slots (expressed as an exponent of 2) to back off before resending the ranging bursts after an upstream collision. These values are configured using the <b>cable upstream range-backoff start end</b> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Table 176** *show controllers cable upstream Field Descriptions (continued)*

| Field                                        | Description                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ranging Backoff Automatic                    | Start and end ranging backoff exponents, which are set automatically, using the <b>cable upstream range-backoff automatic</b> command.<br><br><b>Note</b> These counters are not accurately updated on the Cisco uBR10-MC5X20S cable interface line card, which should manually configure the ranging backoff instead. |
| US timing offset                             | Upstream timing offset adjustment type and value.                                                                                                                                                                                                                                                                      |
| Ranging Insertion Interval                   | Ranging insertion interval.                                                                                                                                                                                                                                                                                            |
| US throttling                                | Status of the upstream throttling.                                                                                                                                                                                                                                                                                     |
| Tx Backoff Start                             | Starting exponential backoff value for data collisions.                                                                                                                                                                                                                                                                |
| Tx Backoff End                               | Ending exponential backoff value for data collisions.                                                                                                                                                                                                                                                                  |
| Modulation Profile Group                     | Set of burst profiles defining an upstream range.                                                                                                                                                                                                                                                                      |
| part_id=                                     | Part number of the PHY chip. FFFF means the PHY chip is turned off.                                                                                                                                                                                                                                                    |
| rev_id=                                      | PHY chip revision number.                                                                                                                                                                                                                                                                                              |
| rev2_id=                                     | PHY chip subrevision number.                                                                                                                                                                                                                                                                                           |
| nb_agc_thr=                                  | Threshold used to control gain.                                                                                                                                                                                                                                                                                        |
| nb_agc_nom=                                  | Accelerate convergence of input power level.                                                                                                                                                                                                                                                                           |
| Range Load Reg Size=                         | Size in symbols for range request bursts.                                                                                                                                                                                                                                                                              |
| Request Load Reg Size=                       | Size in symbols for request bursts.                                                                                                                                                                                                                                                                                    |
| Minislot Size in number of Timebase Ticks is | Size in tick units of upstream minislot. A tick is 6.25 microseconds.                                                                                                                                                                                                                                                  |
| Minislot Size in Symbols                     | Size in symbols of the upstream minislot.                                                                                                                                                                                                                                                                              |
| Bandwidth Requests                           | Number of successful bandwidth requests received in the contention minislots.                                                                                                                                                                                                                                          |
| Piggyback Requests                           | Number of successful bandwidth requests piggybacked with regular data transmissions.                                                                                                                                                                                                                                   |
| Invalid BW Requests                          | Number of invalid bandwidth (BW) requests. An example of an invalid bandwidth request is a modem using a nonexistent service identifier (SID) to request bandwidth.                                                                                                                                                    |
| Minislots Requested                          | Total number of minislots requested.                                                                                                                                                                                                                                                                                   |
| Minislots Granted                            | Total number of minislots granted.                                                                                                                                                                                                                                                                                     |
| Minislot Size in Bytes                       | Size of the minislot in bytes.                                                                                                                                                                                                                                                                                         |
| Map Advance (Dynamic)                        | Dynamic map advance time.                                                                                                                                                                                                                                                                                              |
| Map Count                                    | Total number of map counts.                                                                                                                                                                                                                                                                                            |
| Remote Map Counts                            | Total number of remote map counts.                                                                                                                                                                                                                                                                                     |
| UCD Count                                    | Number of Upstream Channel Descriptors (UCDs) sent for this upstream.                                                                                                                                                                                                                                                  |
| Remote UCD Counts                            | Number of remote UCDs sent for this upstream.                                                                                                                                                                                                                                                                          |

**Table 176** *show controllers cable upstream Field Descriptions (continued)*

| Field                                                                                          | Description                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PHY                                                                                            | Physical layer information for the following: <ul style="list-style-type: none"> <li>us errors—Number of upstream errors.</li> <li>us recoveries—Number of upstream recoveries.</li> </ul>                                                               |
| MAC PHY TSS                                                                                    | Statistics on the integrity of sync status of timestamp snapshot values between MAC and PHY.                                                                                                                                                             |
| MAC PHY Status                                                                                 | MAC physical status for the following: <ul style="list-style-type: none"> <li>bcm3140 status</li> <li>lookout status</li> </ul>                                                                                                                          |
| MAP/UCD Replication Instructions                                                               | MAP/UCD replication instructions.                                                                                                                                                                                                                        |
| DES Ctrl Reg # =                                                                               | Interval data encryption standard (DES) controller register dump.                                                                                                                                                                                        |
| Null Modem RateLimit Dropped Pkts                                                              | (Cisco uBR-MC16U/X, Cisco uBR-MC28U/X only) Number of packets that were dropped because they had a Service Flow ID (SFID) of 0, which occurs when the packets are dropped due to rate-limiting on their original service flow.                           |
| <b>Additional Information for Broadband Processing Engine (BPE) Cable Interface Line Cards</b> |                                                                                                                                                                                                                                                          |
| JIB Version                                                                                    | Revision of the JIB circuitry, which is the custom processor onboard the BPE cards that handles the MAC-layer processing.                                                                                                                                |
| Upconverter is Enabled<br>Output is Enabled                                                    | Status of the upconverter and the signal output. If this field shows that the output is disabled, use the <b>no cable downstream rf-shutdown</b> command to re-enable it.                                                                                |
| Downstream Frequency                                                                           | Configured frequency, in MHz, for the integrated upconverter (if present).                                                                                                                                                                               |
| RF Power                                                                                       | Current RF power, in dBmV, as measured on the cable interface line card upconverter. The upconverter circuitry is accurate to a few tenths of a dBmV, but might vary +/- 1 dBmV depending on the transient noise that occurs when the power is measured. |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in the line configuration mode.

**Related Commands**

| Command                                            | Description                                                               |
|----------------------------------------------------|---------------------------------------------------------------------------|
| <b>cable downstream frequency</b>                  | Configures the downstream center frequency on the integrated upconverter. |
| <b>cable downstream rf-power</b>                   | Configures the desired RF output power on the integrated upconverter.     |
| <b>cable spectrum-group (global configuration)</b> | Creates spectrum groups, which contain one or more upstream frequencies.  |

| Command                                         | Description                                                                                                                             |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable upstream frequency</b>                 | Specifies that the upstream should be set to either a specific center frequency or be set dynamically.                                  |
| <b>show controllers cable upstream spectrum</b> | (Cisco uBR-MC16 line card only) Displays the noise levels for a particular CM or displays the background noise for an entire upstream . |
| <b>show interface cable sid</b>                 | Displays interface controller information for a specific cable access router card slot.                                                 |



# show controllers cable jib

To display the ASIC processor (JIB) register information on a cable interface on the Cisco CMTS router, use the **show controllers cable jib** command in user EXEC or privileged EXEC mode.

**show controllers cable** {*slot/cable-interface-index* | *slot/subslot/cable-interface-index*} **jib**  
**us-partial-reset**

| Syntax Description           |                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides.                                                                                                                         | <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li><li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li><li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li></ul>                                                                                           |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                              |                                                                                                                                                                                                                                                                                                                                  |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. | <ul style="list-style-type: none"><li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li><li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li></ul> |
| <b>jib</b>                   | Displays JIB register information.                                                                                                                        |                                                                                                                                                                                                                                                                                                                                  |
| <b>us-partial-reset</b>      | Displays JIB3 upstream partial reset data.                                                                                                                |                                                                                                                                                                                                                                                                                                                                  |

| Command Modes | User EXEC (>) or<br>Privileged EXEC (#) |
|---------------|-----------------------------------------|
|---------------|-----------------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

| Usage Guidelines | The <b>show controllers cable jib</b> command displays the packet capture buffers retrieved during the partial reset. It displays all of the capture buffers associated with the last partial reset event and also other information useful for determining the Partial Reset state. |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Examples**

The following is a sample output of the **show controllers cable jib** command:

```
Router# show controllers cable 5/0/0 jib us-partial-reset
```

```
Jib3 Upstream Partial Reset Information
```

```
Jib3 Upstream Debug Partial Reset Data
```

```
Partial Reset S/W Counts
```

```

```

```
TOTAL Partial Resets : 3
 PHY Side Partial Resets : 1
 CCF Partial Resets : 1
 FrameP Partial Resets : 0
 FragP Partial Resets : 0
 PktP Partial Resets : 0
 C2C Partial Resets : 1
```

```
Partial Reset States
```

```

```

```
PHY Side : PR_NORMAL
Fauna : PR_NORMAL
```

```
Partial Reset H/W Counts & Status
```

```

```

```
PHY Side Partial Resets : 0x80300001
PHY Side Partial Status0 : 0x00000000
PHY Side Partial Status1 : 0x00000000
```

```
CCF Partial Resets : 0x8C000001
CCF Partial Status1 : 0x00000000
CCF Partial Status2 : 0x00000000
```

```
FrameP Partial Resets : 0x0C000000
FrameP Partial Status : 0x00000000
```

```
FragP Partial Resets : 0x0C000000
FragP Partial Status : 0x00000000
```

```
PktP Partial Resets : 0x0C000000
PktP Partial Status1 : 0x00000000
PktP Partial Status2 : 0x00000000
PktP Partial Status3 : 0x00000000
PktP Partial Status4 : 0x00000000
```

```
C2C Partial Resets : 0x8C000001
C2C Partial Status : 0x00000000
```

```
Partial Reset Packet Capture Buffers
```

```

```

```
PHY Side Buf Ptr1 : 0x1F3DC35C
PHY Side Buf Ptr2 : 0x1F3E4390
PHY Side Buf Cnt : 4079
FA1 Buf Ptr1 : 0x1F3EC3C4
FA1 Buf Ptr2 : 0x1F3F43F8
FA1 Buf Cnt : 2663
FA2 Buf Ptr1 : 0x1F3FC42C
FA2 Buf Ptr2 : 0x1F404460
FA2 Buf Cnt : 1109
FA3 Buf Ptr1 : 0x1F40C494
FA3 Buf Ptr2 : 0x1F4144C8
FA3 Buf Cnt : 1109
FA4 Buf Ptr1 : 0x1F41C4FC
FA4 Buf Ptr2 : 0x1F424530
```

FA4 Buf Cnt : 1109

PHY Side Capture FIFO Data (0xFEFE entries, format: eop, data[31:0]):

----

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| 0, 0xB        | 0, 0x0        | 0, 0x20163    | 0, 0x5440900  |
| 1, 0x6000000  | 0, 0x805000C  | 0, 0x0        | 0, 0xB        |
| 0, 0xFFFF0001 | 0, 0x8000006  | 0, 0x1632F40  | 1, 0x20000    |
| 0, 0x50050006 | 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 |
| 0, 0x4060002  | 1, 0x400002   | 0, 0x400F0004 | 0, 0x0        |
| 0, 0xB        | 0, 0xFFFF0001 | 1, 0x0        | 0, 0x230F0009 |
| 0, 0x0        | 0, 0xB        | 0, 0x0        | 0, 0x20163    |
| 0, 0x1C20900  | 1, 0x6000000  | 0, 0x805000C  | 0, 0x0        |
| 0, 0xB        | 0, 0xFFFF0001 | 0, 0x8000006  | 0, 0x16345C2  |
| 1, 0x20000    | 0, 0x50050006 | 0, 0x0        | 0, 0xB        |
| 0, 0xFFFF0001 | 0, 0x4060002  | 1, 0x400002   | 0, 0x400F0004 |
| 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 | 1, 0x0        |
| 0, 0x230F0009 | 0, 0x0        | 0, 0xB        | 0, 0x0        |
| 0, 0x20163    | 0, 0x8470900  | 1, 0x6000000  | 0, 0x805000C  |
| 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 | 0, 0x8000006  |
| 0, 0x1637402  | 1, 0x20000    | 0, 0x50050006 | 0, 0x0        |
| 0, 0xB        | 0, 0xFFFF0001 | 0, 0x4060002  | 1, 0x400002   |
| 0, 0x400F0004 | 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 |
| 1, 0x0        | 0, 0x230F0009 | 0, 0x0        | 0, 0xB        |
| 0, 0x0        | 0, 0x20163    | 0, 0x6840900  | 1, 0x6000000  |
| 0, 0x805000C  | 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 |
| 0, 0x8000006  | 0, 0x1639C03  | 1, 0x20000    | 0, 0x50050006 |
| 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 | 0, 0x4060002  |
| 1, 0x400002   | 0, 0x400F0004 | 0, 0x0        | 0, 0xB        |
| 0, 0xFFFF0001 | 1, 0x0        | 0, 0x230F0009 | 0, 0x0        |
| 0, 0xB        | 0, 0x0        | 0, 0x20163    | 0, 0xE850900  |
| 1, 0x6000000  | 0, 0x1C06002E | 0, 0x0        | 0, 0x5        |
| 0, 0x10004    | 0, 0x1C       | 0, 0xA1D0005  | 0, 0xE4E8F7   |
| 0, 0x1E6BFB   | 0, 0x794000A  | 0, 0x830301   | 0, 0x4008001  |
| 0, 0x800F5C6  | 0, 0x3D30B06  | 0, 0x44080    | 0, 0xF8FFFFF  |
| 1, 0xFF2FFFFF | 0, 0x400F0004 | 0, 0x0        | 0, 0x5        |
| 0, 0x10004    | 1, 0x10000    | 0, 0x1C06002E | 0, 0x0        |
| 0, 0x1        | 0, 0x10004    | 0, 0x1C       | 0, 0xA1D0005  |
| 0, 0xE4E8F6   | 0, 0x23BE85   | 0, 0x906000A  | 0, 0xA60301   |
| 0, 0x4000001  | 0, 0x100BDD7  | 0, 0xE90B06   | 0, 0x24300    |
| 0, 0x220000   | 1, 0x15A0000  | 0, 0x400F0004 | 0, 0x0        |
| 0, 0x1        | 0, 0x10004    | 1, 0x10000    | 0, 0x805000C  |
| 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 | 0, 0x800001E  |
| 0, 0x1651CB2  | 1, 0x10000    | 0, 0x50050006 | 0, 0x0        |
| 0, 0xB        | 0, 0xFFFF0001 | 0, 0x41E0001  | 1, 0xC310001  |
| 0, 0x400F0004 | 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 |
| 1, 0x0        | 0, 0x230F0009 | 0, 0x0        | 0, 0xB        |
| 0, 0x0        | 0, 0x10165    | 0, 0xE560A00  | 1, 0xE000000  |
| 0, 0x805000C  | 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 |
| 0, 0x800001E  | 0, 0x165229C  | 1, 0x10000    | 0, 0x50050006 |
| 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 | 0, 0x41E0001  |
| 1, 0xC310001  | 0, 0x400F0004 | 0, 0x0        | 0, 0xB        |
| 0, 0xFFFF0001 | 1, 0x0        | 0, 0x230F0009 | 0, 0x0        |
| 0, 0xB        | 0, 0x0        | 0, 0x10165    | 0, 0x4940A00  |
| 1, 0xE000000  | 0, 0x805000C  | 0, 0x0        | 0, 0xB        |
| 0, 0xFFFF0001 | 0, 0x800001E  | 0, 0x1652647  | 1, 0x10000    |
| 0, 0x50050006 | 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 |
| 0, 0x41E0001  | 1, 0xC310001  | 0, 0x400F0004 | 0, 0x0        |
| 0, 0xB        | 0, 0xFFFF0001 | 1, 0x0        | 0, 0x230F0009 |
| 0, 0x0        | 0, 0xB        | 0, 0x0        | 0, 0x10165    |
| 0, 0x2560A00  | 1, 0xE000000  | 0, 0x805000C  | 0, 0x0        |
| 0, 0xB        | 0, 0xFFFF0001 | 0, 0x800001E  | 0, 0x1653424  |
| 1, 0x10000    | 0, 0x50050006 | 0, 0x0        | 0, 0xB        |
| 0, 0xFFFF0001 | 0, 0x41E0001  | 1, 0xC310001  | 0, 0x400F0004 |
| 0, 0x0        | 0, 0xB        | 0, 0xFFFF0001 | 1, 0x0        |

## ■ show controllers cable jib

```

0, 0x230F0009 0, 0x0 0, 0xB 0, 0x0
0, 0x10165 0, 0x1D70A00 1, 0xE000000 0, 0x805000C
0, 0x0 0, 0xB 0, 0xFFFF0001 0, 0x800001E
0, 0x1656396 1, 0x10000 0, 0x50050006 0, 0x0
0, 0xB 0, 0xFFFF0001 0, 0x41E0001 1, 0xC310001
0, 0x400F0004 0, 0x0 0, 0xB 0, 0xFFFF0001
1, 0x0 0, 0x230F0009 0, 0x0 0, 0xB
0, 0x0 0, 0x10165 0, 0x1A0A00 1, 0xE000000
0, 0x805000C 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x800001E 0, 0x16591E8 1, 0x10000 0, 0x50050006
0, 0x0 0, 0xB 0, 0xFFFF0001 0, 0x41E0001
1, 0xC310001 0, 0x400F0004 0, 0x0 0, 0xB
0, 0xFFFF0001 1, 0x0 0, 0x230F0009 0, 0x0
0, 0xB 0, 0x0 0, 0x10165 0, 0xDC0A00
1, 0xE000000 0, 0x805000C 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x800001E 0, 0x165C292 1, 0x10000
0, 0x50050006 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x41E0001 1, 0xC310001 0, 0x400F0004 0, 0x0
0, 0xB 0, 0xFFFF0001 1, 0x0 0, 0x230F0009
0, 0x0 0, 0xB 0, 0x0 0, 0x10165
0, 0xDDE0A00 1, 0xE000000 0, 0x805000C 0, 0x0
0, 0xB 0, 0xFFFF0001 0, 0x800001E 0, 0x165EFA0
1, 0x10000 0, 0x50050006 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x41E0001 1, 0xC310001 0, 0x400F0004
0, 0x0 0, 0xB 0, 0xFFFF0001 1, 0x0
0, 0x230F0009 0, 0x0 0, 0xB 0, 0x0
0, 0x10166 0, 0xD5F0A00 1, 0xE000000 0, 0x805000C
0, 0x0 0, 0xB 0, 0xFFFF0001 0, 0x800001E
0, 0x1661F6C 1, 0x10000 0, 0x50050006 0, 0x0
0, 0xB 0, 0xFFFF0001 0, 0x41E0001 1, 0xC310001
0, 0x400F0004 0, 0x0 0, 0xB 0, 0xFFFF0001
1, 0x0 0, 0x230F0009 0, 0x0 0, 0xB
0, 0x0 0, 0x10166 0, 0xE2F0A00 1, 0xE000000
0, 0x805000C 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x800001E 0, 0x1665018 1, 0x10000 0, 0x50050006
0, 0x0 0, 0xB 0, 0xFFFF0001 0, 0x41E0001
1, 0xC310001 0, 0x400F0004 0, 0x0 0, 0xB
0, 0xFFFF0001 1, 0x0 0, 0x230F0009 0, 0x0
0, 0xB 0, 0x0 0, 0x10166 0, 0x9E40A00
1, 0xE000000 0, 0x805000C 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x800001E 0, 0x1667BAC 1, 0x10000
0, 0x50050006 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x41E0001 1, 0xC310001 0, 0x400F0004 0, 0x0
0, 0xB 0, 0xFFFF0001 1, 0x0 0, 0x1C06002E
0, 0x0 0, 0x6 0, 0x30004 0, 0x1C
0, 0xA1D0005 0, 0xE4E8F7 0, 0x1E6BFC 0, 0x222000A
0, 0x870301 0, 0x4008003 0, 0x800CE55 0, 0x19A0B06
0, 0x244C0 0, 0xF1F0000 1, 0x570000 0, 0x400F0004
0, 0x0 0, 0x6 0, 0x30004 1, 0x10000
0, 0x230F0009 0, 0x0 0, 0xB 0, 0x0
0, 0x10166 0, 0x9650A00 1, 0xE000000 0, 0x805000C
0, 0x0 0, 0xB 0, 0xFFFF0001 0, 0x800001E
0, 0x166AB3F 1, 0x10000 0, 0x50050006 0, 0x0
0, 0xB 0, 0xFFFF0001 0, 0x41E0001 1, 0xC310001
0, 0x400F0004 0, 0x0 0, 0xB 0, 0xFFFF0001
1, 0x0 0, 0x230F0009 0, 0x0 0, 0xB
0, 0x0 0, 0x10166 0, 0x8E60A00 1, 0xE000000
0, 0x805000C 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x800001E 0, 0x166DAB7 1, 0x10000 0, 0x50050006
0, 0x0 0, 0xB 0, 0xFFFF0001 0, 0x41E0001
1, 0xC310001 0, 0x400F0004 0, 0x0 0, 0xB
0, 0xFFFF0001 1, 0x0 0, 0x230F0009 0, 0x0
0, 0xB 0, 0x0 0, 0x10167 0, 0x9B00A00
1, 0xE000000 0, 0x805000C 0, 0x0 0, 0xB

```

```

0, 0xFFFF0001 0, 0x800001E 0, 0x1670B84 1, 0x10000
0, 0x50050006 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x41E0001 1, 0xC310001 0, 0x400F0004 0, 0x0
0, 0xB 0, 0xFFFF0001 1, 0x0 0, 0x230F0009
0, 0x0 0, 0xB 0, 0x0 0, 0x10167
0, 0x5680A00 1, 0xE000000 0, 0x805000C 0, 0x0
0, 0xB 0, 0xFFFF0001 0, 0x800001E 0, 0x167375D
1, 0x10000 0, 0x50050006 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x41E0001 1, 0xC310001 0, 0x400F0004
0, 0x0 0, 0xB 0, 0xFFFF0001 1, 0x0
0, 0x230F0009 0, 0x0 0, 0xB 0, 0x0
0, 0x10167 0, 0x4EC0A00 1, 0xE000000 0, 0x805000C
0, 0x0 0, 0xB 0, 0xFFFF0001 0, 0x800001E
0, 0x16766D2 1, 0x10000 0, 0x50050006 0, 0x0
0, 0xB 0, 0xFFFF0001 0, 0x41E0001 1, 0xC310001
0, 0x400F0004 0, 0x0 0, 0xB 0, 0xFFFF0001
1, 0x0 0, 0x805000C 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x8000006 0, 0x16781A8 1, 0x20000
0, 0x50050006 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x4060002 1, 0x400002 0, 0x400F0004 0, 0x0
0, 0xB 0, 0xFFFF0001 1, 0x0 0, 0x230F0009
0, 0x0 0, 0xB 0, 0x0 0, 0x20167
0, 0x42D0900 1, 0x6000000 0, 0x805000C 0, 0x0
0, 0xB 0, 0xFFFF0001 0, 0x8000006 0, 0x1678A69
1, 0x20000 0, 0x50050006 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x4060002 1, 0x400002 0, 0x400F0004
0, 0x0 0, 0xB 0, 0xFFFF0001 1, 0x0
0, 0x230F0009 0, 0x0 0, 0xB 0, 0x0
0, 0x20167 0, 0xCEE0900 1, 0x6000000 0, 0x230F0009
0, 0x0 0, 0xB 0, 0x0 0, 0x10167
0, 0x32D0A00 1, 0xE000000 0, 0x805000C 0, 0x0
0, 0xB 0, 0xFFFF0001 0, 0x800001E 0, 0x16794F2
1, 0x10000 0, 0x50050006 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x41E0001 1, 0xC310001 0, 0x400F0004
0, 0x0 0, 0xB 0, 0xFFFF0001 1, 0x0
0, 0x805000C 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x8000006 0, 0x1679969 1, 0x20000 0, 0x50050006
0, 0x0 0, 0xB 0, 0xFFFF0001 0, 0x4060002
1, 0x400002 0, 0x400F0004 0, 0x0 0, 0xB
0, 0xFFFF0001 1, 0x0 0, 0x230F0009 0, 0x0
0, 0xB 0, 0x0 0, 0x20167 0, 0xBEE0900
1, 0x6000000 0, 0x805000C 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x8000006 0, 0x167BDAA 1, 0x20000
0, 0x50050006 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x4060002 1, 0x400002 0, 0x400F0004 0, 0x0
0, 0xB 0, 0xFFFF0001 1, 0x0 0, 0x230F0009
0, 0x0 0, 0xB 0, 0x0 0, 0x20167
0, 0x2F0900 1, 0x6000000 0, 0x230F0009 0, 0x0
0, 0xB 0, 0x0 0, 0x10167 0, 0x52F0A00
1, 0xE000000 0, 0x805000C 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x8000006 0, 0x167C7AB 1, 0x20000
0, 0x50050006 0, 0x0 0, 0xB 0, 0xFFFF0001
0, 0x4060002 1, 0x400002 0, 0x400F0004 0, 0x0
0, 0xB 0, 0xFFFF0001 1, 0x0 0, 0x230F0009

```

```

007095: SLOT 5/0: Apr 27 04:43:17.502 Eastern: %UBR10000-5-UNREGSIDTIMEOUT: CM
deleted unregistered Cable Modem 001e.6bfc.da8e0, 0x0 0, 0xB
0, 0x0 0, 0x20167

```

```

0, 0xA300900 1, 0x6000000 0, 0x805000C 0, 0x0
0, 0xB 0, 0xFFFF0001 0, 0x8000006 0, 0x167E6EC
1, 0x20000 0, 0x50050006 0, 0x0 0, 0xB
0, 0xFFFF0001 0, 0x4060002 1, 0x400002 0, 0x400F0004
0, 0x0 0, 0xB 0, 0xFFFF0001 1, 0x0
0, 0x10040048 0, 0x8003 0, 0xB 0, 0x20009

```

```
show controllers cable jib
```

```
0, 0x1020042 0, 0x1006F2A 0, 0xFFFFFFFF 0, 0xFFF001E
.
.
.
```

Table 174 describes the fields shown in the **show controllers cable jib** command display.

**Table 177** *show controllers cable jib Field Descriptions*

| Field                   | Description                                                                                                    |
|-------------------------|----------------------------------------------------------------------------------------------------------------|
| TOTAL Partial Resets    | Total number of partial resets.                                                                                |
| PHY Side Partial Resets | Number of partial resets that occurred on the PHY side of the network.                                         |
| CCF Partial Resets      | Number of partial resets that occurred on the Continuous Concatenation and Fragmentation (CCF) processor.      |
| FrameP Partial Resets   | Number of partial resets that occurred on the Frame Processor (FrameP).                                        |
| FragP Partial Resets    | Number of partial resets that occurred on the Fragmentation Processor (FragP).                                 |
| PktP Partial Resets     | Number of partial resets that occurred on the Packet Processor (PktP).                                         |
| C2C Partial Resets      | Number of partial resets that occurred on the Chip to Chip (also called FL2FA—Flora to Fauna) (C2C) processor. |
| PHY Side                | Partial reset status on the PHY side.                                                                          |
| Fauna                   | Partial reset status on the Fauna.                                                                             |
| PHY Side Partial Resets | Number of partial resets that occurred on the PHY side processor.                                              |
| PHY Side Partial Status | Partial reset status on the PHY side.                                                                          |
| CCF Partial Resets      | Number of partial resets that occurred on the CCF processor.                                                   |
| CCF Partial Status      | Partial reset status on the CCF processor.                                                                     |
| FrameP Partial Resets   | Number of partial resets that occurred on the Frame processor.                                                 |
| FrameP Partial Status   | Partial reset status on the Frame processor.                                                                   |
| FragP Partial Resets    | Number of partial resets that occurred on the Fragmentation processor.                                         |
| FragP Partial Status    | Partial reset status on the Fragmentation processor.                                                           |
| PktP Partial Resets     | Number of partial resets that occurred on the Packet processor.                                                |
| PktP Partial Status     | Partial reset status on the Packet processor.                                                                  |
| C2C Partial Resets      | Number of partial resets that occurred on the C2C processor.                                                   |
| C2C Partial Status      | Partial reset status on the C2C processor.                                                                     |
| PHY Side Buf Ptr        | PHY partial reset packet capture buffer pointer.                                                               |
| PHY Side Buf Cnt        | PHY partial reset packet capture buffer count.                                                                 |
| FA1 Buf Ptr             | Partial reset packet capture buffer 1 pointer on the Fauna processor.                                          |
| FA1 Buf Cnt             | Number of packet capture buffer 1 counts associated with the partial reset on the Fauna processor.             |
| FA2 Buf Ptr             | Partial reset packet capture buffer 2 pointer on the Fauna processor.                                          |

**Table 177** *show controllers cable jib Field Descriptions (continued)*

| Field       | Description                                                                                        |
|-------------|----------------------------------------------------------------------------------------------------|
| FA2 Buf Cnt | Number of packet capture buffer 2 counts associated with the partial reset on the Fauna processor. |
| FA3 Buf Ptr | Partial reset packet capture buffer 3 pointer on the Fauna processor.                              |
| FA3 Buf Cnt | Number of packet capture buffer 3 counts associated with the partial reset on the Fauna processor. |
| FA4 Buf Ptr | Partial reset packet capture buffer 4 pointer on the Fauna processor.                              |
| FA4 Buf Cnt | Number of packet capture buffer 4 counts associated with the partial reset on the Fauna processor. |

#### Related Commands

| Command                       | Description                                                                                         |
|-------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>show controllers cable</b> | Displays information about the interface controllers on a cable interface on the Cisco CMTS router. |

# show controllers cable upstream spectrum

To display the noise levels for a particular CM or to display the background noise for an entire upstream on the Cisco uBR-MC16 line card, use the **show controllers cable upstream spectrum** command in user EXEC or privileged EXEC mode.

**show controllers cable** { *slot/port* | *slot/subslot/port* } **upstream** *n* **spectrum** [ *ip-address* | *mac-address* ] *start-freq* *end-freq* *res-freq*

| Syntax Description       |                                                                                                                                                                                                                                     |  |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <i>slot/port</i>         | Identifies the cable interface and downstream port on the Cisco uBR7100 series and Cisco uBR7200 series routers.                                                                                                                    |  |
|                          | On the Cisco uBR7100 series router, the only valid value is <b>1/0</b> . On the Cisco uBR7200 series router, <i>slot</i> can range from 3 to 6, and <i>port</i> can be 0 or 1, depending on the cable interface.                    |  |
| <i>slot/subslot/port</i> | Identifies the cable interface on the Cisco uBR10012 router. The following are the valid values:                                                                                                                                    |  |
|                          | <ul style="list-style-type: none"> <li>• <i>slot</i> = 5 to 8</li> <li>• <i>subslot</i> = 0 or 1</li> <li>• <i>port</i> = 0 to 4 (depending on the cable interface)</li> </ul>                                                      |  |
| <i>n</i>                 | Port number for the desired upstream (0 to 5).                                                                                                                                                                                      |  |
| <i>ip-address</i>        | (Optional) IP address, in dotted decimal notation, for a CM on the specified upstream.                                                                                                                                              |  |
| <i>mac-address</i>       | (Optional) MAC address, in dotted hexadecimal notation, for a CM on the specified upstream.                                                                                                                                         |  |
| <i>start-freq</i>        | Starting frequency for the frequency range that is being reported (5 to 42 MHz; can also be specified as 5000 to 42000 KHz or 5000000 to 42000000 Hz).                                                                              |  |
| <i>end-freq</i>          | Ending frequency for the frequency range that is being reported (5 to 42 MHz).                                                                                                                                                      |  |
|                          | <b>Note</b> The ending frequency must be greater than the starting frequency and must be specified using the same units as the starting frequency (MHz, KHz, Hz).                                                                   |  |
| <i>res-freq</i>          | Resolution frequency to determine the number of data points for the report (12 to 37000 KHz).                                                                                                                                       |  |
|                          | <b>Note</b> The resolution frequency must be specified in the same units as the starting and ending frequency (MHz, KHz, Hz). To use a resolution value less than 1 MHz, you must specify the other parameters in either Hz or KHz. |  |

**Command Modes** User EXEC, Privileged EXEC



## Command History

| Release    | Modification                                                                                            |
|------------|---------------------------------------------------------------------------------------------------------|
| 12.1(7)CX1 | This command was introduced for Cisco CMTS routers using the Cisco uBR-MC16S cable interface line card. |
| 12.2(8)BC2 | Support was added for the Cisco uBR10012 router and the Cisco uBR-LCP2-MC16S cable interface line card. |
| 12.3(21)BC | This command is obsolete.                                                                               |

## Usage Guidelines

Cisco IOS Release 12.3(9a)BC adds the **tech-support** keyword to the **show controllers cable** command. This change allows users with large numbers of online cable modems to collect the necessary line card information without consuming the console session for a long period of time.

Additional and related improvements are also available for the **show cable tech-support** command.

For all supported releases, the **show controllers cable upstream spectrum** command displays the power in dBmV for a given frequency range for the specified upstream. The frequency range can cover any portion of the DOCSIS upstream frequency range (5 to 42 MHz), and the frequency range can be divided into a resolution as small as 12 KHz.

If a CM is specified by its IP address or MAC address, the power information for that particular CM is given. If no IP or MAC address is given, the command displays the background noise for the entire upstream. All displays use historical averaging of data collected at the time the command is used; historical information is not saved.



## Note

Cisco cable interface line cards always program the upstream's center frequency in 16-KHz increments, and this is the frequency displayed by the **show controller cable upstream** command. For example, if you use the **cable upstream frequency** command to specify a center frequency of 27 MHz (**cable upstream x frequency 27000000**), the actual center frequency will be 27.008 MHz, which is the next-highest 16-KHz boundary.



## Tip

By default, the **show controller cable upstream** command displays its output to the router's console port. To display the command's output when logged in during a Telnet session over an Ethernet port, use the **terminal monitor** command before giving the **show controller cable upstream** command.

## Examples

The following example shows the **show controllers cable upstream** command displaying the power information for a particular CM on upstream 5 of cable interface slot 3/0. The power information is displayed over the entire upstream (5–42 MHz), with a resolution of 5 MHz:

```
Router# show cable modem
```

| MAC Address    | IP Address   | I/F     | MAC State | Prim Sid | RxPwr (db) | Timing Offset | Num CPEs | BPI Enbld |
|----------------|--------------|---------|-----------|----------|------------|---------------|----------|-----------|
| ...            |              |         |           |          |            |               |          |           |
| 00d0.ba77.7595 | 10.20.114.34 | C3/0/U5 | online    | 1        | 0.25       | 2740          | 1        | yes       |
| 00d0.ba77.7621 | 10.20.114.17 | C3/0/U5 | online    | 2        | 0.25       | 2740          | 2        | yes       |
| 00d0.ba77.7533 | 10.20.114.55 | C3/0/U5 | online    | 3        | 0.25       | 2740          | 1        | yes       |
| ...            |              |         |           |          |            |               |          |           |

```
Router# show controllers cable 3/0 upstream 5 spectrum 10.20.114.34 5 42 5
```

```
02:16:49: Spectrum DATA(@0x4B060004) for u5: 4995-41991KHz(resolution 4992KHz, sid 1):
```

# show controllers cable upstream spectrum

```
02:16:49: Freq(KHz) dBmV Chart
02:16:49: 4995 : -5 *****
02:16:49: 9987 : -7 *****
02:16:49: 14979: -24 *****
02:16:49: 19971: -35 *****
02:16:49: 24963: -39 *****
02:16:49: 29955: -35 *****
02:16:49: 34947: -37 *****
02:16:49:
Router#
```



## Note

The output for each frequency range includes a time-stamp, the ending frequency for each range (in KHz), the historical average power level for that range (in dBmV), and a series of asterisks that provides a graphical representation of the noise floor level for the signal (a stronger signal is indicated by more asterisks).

The following example shows a partial display of the background noise data for upstream 4 of cable interface slot 6/0. The command covers the entire upstream spectrum (5–42 MHz) at the minimum resolution of 12 KHz.

```
Router# show controller cable 6/0 upstream 4 spectrum 5000 42000 12
```

```
02:15:54: Spectrum DATA(@0x4B060004) for u5: 4995-41991KHz(resolution 12KHz, sid 1):
02:15:54: Freq(KHz) dBmV Chart
02:15:54: 4995 : -100
02:15:54: 5007 : -67
02:15:54: 5019 : -67
02:15:54: 5031 : -67
02:15:54: 5043 : -64
02:15:54: 5055 : -64
02:15:54: 5067 : -61
...
02:15:54: 8199 : -67
02:15:54: 8211 : -61
02:15:54: 8223 : -64
02:15:54: 8235 : -57
02:15:54: 8247 : -49 ***
02:15:54: 8259 : -52 **
02:15:54: 8271 : -46 *****
02:15:54: 8283 : -45 *****
02:15:54: 8295 : -52 **
02:15:54: 8307 : -48 *****
02:15:54: 8319 : -45 *****
02:15:54: 8331 : -41 *****
02:15:54: 8343 : -39 *****
02:15:54: 8355 : -39 *****
02:15:54: 8367 : -40 *****
02:15:54: 8379 : -43 *****
02:15:54: 8391 : -44 *****
02:15:54: 8403 : -33 *****
02:15:54: 8415 : -32 *****
02:15:54: 8427 : -30 *****
02:15:54: 8439 : -27 *****
02:15:54: 8451 : -28 *****
02:15:54: 8463 : -36 *****
02:15:54: 8475 : -40 *****
02:15:54: 8487 : -37 *****
02:15:54: 8499 : -40 *****
02:15:54: 8511 : -39 *****
02:15:54: 8523 : -28 *****
02:15:54: 8535 : -29 *****
02:15:54: 8547 : -27 *****
```

```

02:15:54: 8559 : -29 *****
02:15:54: 8571 : -40 *****
02:15:54: 8583 : -36 *****
02:15:54: 8595 : -28 *****
02:15:54: 8607 : -30 *****
...
02:15:54: 11247: -40 *****
02:15:54: 11259: -44 *****
02:15:54: 11271: -44 *****
02:15:54: 11283: -46 *****
02:15:54: 11295: -46 *****
02:15:54: 11307: -42 *****
02:15:54: 11319: -46 *****
02:15:54: 11331: -48 *****
02:15:54: 11343: -53 *
02:15:54: 11355: -55
02:15:54: 11367: -54 *
02:15:54: 11379: -57
02:15:54: 11391: -61
02:15:54: 11403: -60
02:15:54: 11415: -60
02:15:54: 11427: -60
02:15:54: 11439: -61
02:15:54: 11451: -57
02:15:54: 11463: -58
02:15:54: 11475: -67
02:15:54: 11487: -58
...

```

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                  | Description                                                                                                                  |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>cable modulation-profile</b>          | Creates a cable modulation profile.                                                                                          |
| <b>cable upstream hop-priority</b>       | Determines the order of the corrective actions to be taken when ingress noise exceeds the allowable value for an upstream.   |
| <b>cable upstream modulation-profile</b> | Configures an upstream for one modulation profile (static profile) or two modulation profiles (Dynamic Upstream Modulation). |
| <b>show cable hop</b>                    | Displays the current hop period and threshold for an upstream, along with other statistics.                                  |
| <b>show cable modem cnr</b>              | Displays information about the upstream carrier-to-noise ratio (CNR) for a particular cable modem.                           |
| <b>show cable modulation-profile</b>     | Displays the cable modulation profiles that have been created.                                                               |
| <b>show controllers cable</b>            | Displays detailed statistics for the cable interface.                                                                        |

# show controllers cable-modem

To display high-level controller information for the router’s cable interface, use the **show controllers cable-modem** command in privileged EXEC mode.

Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

**show controllers cable-modem** *number* [**all**]

|                    |               |                                                                                                                                                                        |
|--------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>number</i> | Identifies the cable interface (always 0).                                                                                                                             |
|                    | <b>all</b>    | (Optional) Displays detailed, multi-page output, including chip-level settings, transmit and receive ring contents, and MAC-layer and PHY-layer registers and buffers. |

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

| Command History | Release    | Modification                                                          |
|-----------------|------------|-----------------------------------------------------------------------|
|                 | 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router. |
|                 | 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.           |
|                 | 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.           |
|                 | 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                 | 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.           |

**Usage Guidelines**

The **show controllers cable-modem** display begins with information from the first few registers of the Broadcom BCM3300 chip. Next is buffer information for the receive, receive MAC message, buffer descriptor, and packet descriptor rings. Then comes MIB statistics from the BCM3300 chip, DMA base registers to indicate where the rings start, global control and status information, and finally interrupts for the interrupt code.

When using this command, be sure to check the tx\_count and the tx\_head and tx\_tail values for the buffer descriptor (TX BD) and packet descriptor (TX PD) rings. The tx\_count should be greater than 0, and the tx\_head and tx\_tail values should not be equal. If these values do not change for several minutes, it could indicate that there are packets stuck on the ring. This condition is often caused by the CMTS not giving grants.

**Examples**

The following shows typical output for the **show controllers cable-modem** command:

```
Router# show controllers cable-modem 0
BCM Cable interface 0:
BCM3300 unit 0, idb 0x200EB4, ds 0x82D4748, regaddr = 0x800000, reset_mask 0x80
station address 0010.7b43.aa01 default station address 0010.7b43.aa01
PLD VERSION: 32

MAC State is ranging_2_state, Prev States = 7
MAC mcfilter 01E02F00 data mcfilter 01000000
```

```

DS: BCM 3116 Receiver: Chip id = 2
US: BCM 3037 Transmitter: Chip id = 30B4

Tuner: status=0x00
Rx: tuner_freq 699000000, symbol_rate 5055849, local_freq 11520000
 snr_estimate 33406, ber_estimate 0, lock_threshold 26000
 QAM in lock, FEC in lock, qam_mode QAM_64
Tx: tx_freq 20000000, power_level 0x3E, symbol_rate 1280000

DHCP: TFTP server = 4.0.0.32, TOD server = 4.0.0.188
 Security server = 0.0.0.0, Timezone Offset = 0.0.4.32
 Config filename =

buffer size 1600

RX data PDU ring with 32 entries at 0x201D40
 rx_head = 0x201D78 (7), rx_p = 0x831BE04 (7)
 00 pak=0x8326318 buf=0x225626 status=0x80 pak_size=0
 01 pak=0x83241A0 buf=0x21DE5A status=0x80 pak_size=0
 02 pak=0x83239C0 buf=0x21C22A status=0x80 pak_size=0
 03 pak=0x8328C70 buf=0x22EA22 status=0x80 pak_size=0
 04 pak=0x8325F28 buf=0x22480E status=0x80 pak_size=0
 05 pak=0x8327CB0 buf=0x22B1C2 status=0x80 pak_size=0
 06 pak=0x8323BB8 buf=0x21C936 status=0x80 pak_size=0

RX MAC message ring with 8 entries at 0x201E80
 rx_head_mac = 0x201E88 (1), rx_p_mac = 0x831BE80 (1)
 00 pak=0x8326120 buf=0x224F1A status=0x80 pak_size=0
 01 pak=0x8324590 buf=0x21EC72 status=0x80 pak_size=0
 02 pak=0x8323FA8 buf=0x21D74E status=0x80 pak_size=0
 03 pak=0x8326EE8 buf=0x22806E status=0x80 pak_size=0
 04 pak=0x8328E68 buf=0x22F12E status=0x80 pak_size=0
 05 pak=0x8327AB8 buf=0x22AAB6 status=0x80 pak_size=0
 06 pak=0x8328880 buf=0x22DC0A status=0x80 pak_size=0
 07 pak=0x8326CF0 buf=0x227962 status=0xA0 pak_size=0

TX BD ring with 8 entries at 0x201FB8, tx_count = 0
 tx_head = 0x201FD8 (4), head_txp = 0x831BF20 (4)
 tx_tail = 0x201FD8 (4), tail_txp = 0x831BF20 (4)
 00 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
 01 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
 02 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
 03 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
 04 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
 05 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
 06 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
 07 pak=0x000000 buf=0x200000 status=0x20 pak_size=0

TX PD ring with 8 entries at 0x202038, tx_count = 0
 tx_head_pd = 0x202838 (4)
 tx_tail_pd = 0x202838 (4)
 00 status=0x00 bd_index=0x0000 len=0x0000 hdr_len=0x0000
 ehdr: 01 06 02 74 34 11
 01 status=0x00 bd_index=0x0001 len=0x0000 hdr_len=0x0000
 ehdr: 01 06 02 74 34 11
 02 status=0x00 bd_index=0x0002 len=0x0000 hdr_len=0x0000
 ehdr: 01 06 02 74 34 11
 03 status=0x00 bd_index=0x0003 len=0x0000 hdr_len=0x0000
 ehdr: 01 06 02 74 34 11
 04 status=0x00 bd_index=0x0004 len=0x0000 hdr_len=0x0000
 ehdr: 01 06 02 74 34 11
 05 status=0x00 bd_index=0x0005 len=0x0000 hdr_len=0x0000
 ehdr: 01 06 02 74 34 11
 06 status=0x00 bd_index=0x0006 len=0x0000 hdr_len=0x0000

```

```

ehdr: 01 06 02 74 34 11
07 status=0x20 bd_index=0x0007 len=0x0000 hdr_len=0x0000
ehdr: 01 06 02 74 34 11

MIB Statistics
DS fifo full = 0, Rerequests = 0
DS mac msg overruns = 0, DS data overruns = 0
Qualified maps = 348, Qualified syncs = 73
CRC fails = 0, HDR chk fails = 0
Data pdus = 0, Mac msgs = 423
Valid hdrs = 423

BCM3300 Registers:
downstream dma:
 ds_data_bd_base=0x001D40, ds_mac_bd_base=0x001E80
 ds_data_dma_ctrl=0x98, ds_mac_dma_ctrl=0xD8
 ds_dma_data_index=0x0007, ds_dma_msg_index=0x0000
upstream dma:
 us_bd_base=0x001FB8, us_pd_base=0x002038
 us_dma_ctrl=0x80, us_dma_tx_start=0x00
Global control and status:
 global_ctrl_status=0x00
interrupts:
 irq_pend=0x0008, irq_mask=0x00F7
Router#

```

The following shows an excerpt from the display for the **all** option:

```

Router# show controllers cable-modem 0 all
BCM MAC/PHY: Chip id = BCM3300 Revision A (1)

BCM3220 unit 0, idb 0x81068880, ds 0x8106B8A0, regaddr = 0x10100000, reset_mask 0x80
station address 0006.53b6.57bd default station address 0006.53b6.57bd
MAC mcfilter 01E02F00 data mcfilter 00000000

buffer size 1856
RX data PDU ring with 32 entries at 0x10030F00
 rx_head = 0x10030F78 (15), rx_p = 0x8106B8F8 (15)
 00 pak=0x810798C0 buf=0x10044F56 status=0x80 pak_size=0
 01 pak=0x81079BB4 buf=0x1004575E status=0x80 pak_size=0
...

Tuner: status=0x00
Rx: tuner_freq 645000000, symbol_rate 5056000, local_freq 11520000
 snr_estimate 345(TenthdB), ber_estimate 0, lock_threshold 23000
 QAM in lock, FEC in lock, qam_mode QAM_64 (Annex B)
Tx: tx_freq 27984000, symbol_rate 16 (2560000 sym/sec)
 power_level: 29.75 dBmV (current)
 30 (gain in US AMP units)
 5 (BCM3300 attenuation in .4 dB units)
IF AGC=0x2010 (8208) RF AGC=0x3753 (14163)
Combined AGC = 22371 (band = 1)

Estimated Downstream Power: 7.9 dBmV

Platform check 8400000

Router#

```

**Note**

The **show controllers cable-modem 0 all** command displays extensive information about the current state of the modem and its MAC-layer and PHY-layer registers and buffers. You need to open a capture buffer on your terminal or Telnet software to log this information before you give this command.

[Table 178](#) describes the significant fields shown by the **show controllers cable-modem** command. For more information, see the Broadcom documentation for the BCM3300 chip.

**Table 178** *show controllers cable-modem Field Descriptions*

| Field                   | Description                                                                                                                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BCM3300 unit            | Unit number of this BCM3300 chip.                                                                                                                                                                                       |
| idb                     | Interface description block number.                                                                                                                                                                                     |
| ds                      | Downstream channel.                                                                                                                                                                                                     |
| regaddr                 | Indicates the start of the BCM3300 registers.                                                                                                                                                                           |
| reset_mask              | Indicates the bit to hit when resetting the chip.                                                                                                                                                                       |
| station address         | MAC address of this router's cable interface.                                                                                                                                                                           |
| default station address | Default MAC address assigned by the factory for this router.                                                                                                                                                            |
| PLD VERSION             | PLD version of the BCM3300 chip.                                                                                                                                                                                        |
| MAC State               | Current MAC state of the router.                                                                                                                                                                                        |
| Prev States             | Number of states that have previously existed since initialization.                                                                                                                                                     |
| MAC mfilter             | MAC control filter for MAC messages.                                                                                                                                                                                    |
| data mfilter            | MAC control filter for data.                                                                                                                                                                                            |
| DS                      | Downstream Broadcom receiver chip number and ID.                                                                                                                                                                        |
| US                      | Upstream Broadcom transmitter chip number and ID.                                                                                                                                                                       |
| Tuner: status           | Current status of the tuner.                                                                                                                                                                                            |
| Rx: tuner_freq          | Downstream frequency (in Hz) that the router searched for and found.                                                                                                                                                    |
| symbol_rate             | Downstream frequency in symbols per second.                                                                                                                                                                             |
| local_freq              | Frequency on which the transmitter and the tuner communicate.                                                                                                                                                           |
| snr_estimate            | Estimate of signal-to-noise ratio (SNR) in dB multiplied by 1000.                                                                                                                                                       |
| ber_estimate            | Estimate of bit error rate (always 0).                                                                                                                                                                                  |
| lock_threshold          | Minimum signal-to-noise ratio (SNR) that the router will accept as a valid lock.                                                                                                                                        |
| qam_mode                | The modulation scheme used in the downstream direction.                                                                                                                                                                 |
| Tx: tx_freq             | Upstream frequency sent to the router by the CMTS in the UCD message.                                                                                                                                                   |
| power_level             | Transmit power level as set in the hardware, expressed as a hexadecimal value. The units are unique to the hardware used. Use the <b>show controllers cable-modem mac state</b> command to see the power level in dBmV. |
| symbol_rate             | Upstream frequency in symbols per second.                                                                                                                                                                               |
| TFTP server             | IP address of the TFTP server at the CMTS.                                                                                                                                                                              |
| TOD server              | IP address of the time-of-day server at the CMTS.                                                                                                                                                                       |
| Security server         | IP address of the security server at the CMTS.                                                                                                                                                                          |

**Table 178** *show controllers cable-modem Field Descriptions*

| Field                 | Description                                                                                                                                                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Timezone Offset       | Correction received from the DHCP server to synchronize the router time clock with the CMTS.                                                                                                                 |
| Config filename       | Name of the file stored on the cable company's TFTP server that contains operational parameters for the router.                                                                                              |
| buffer size           | Size in bytes of the BCM3300 message buffers.                                                                                                                                                                |
| RX data PDU ring:     | Indicates the memory location of the beginning of buffer information for the receive data ring.                                                                                                              |
| rx_head               | Indicates current head buffer descriptor.                                                                                                                                                                    |
| rx_p                  | Indicates current head packet descriptor.                                                                                                                                                                    |
| RX MAC message ring:  | Indicates the memory location of the beginning of buffer information for the receive MAC message ring.                                                                                                       |
| rx_head_mac           | Indicates current head buffer descriptor.                                                                                                                                                                    |
| rx_p_mac              | Indicates current head packet descriptor.                                                                                                                                                                    |
| TX BD ring:           | Indicates the memory location of the beginning of buffer information for the transmit buffer descriptor ring.                                                                                                |
| tx_count              | If tx_count is 0, or if tx_head and tx_tail are equal and there is no change for a period of time, it means there are packets stuck on the ring. This condition may be caused by the CMTS not giving grants. |
| tx_head               | Indicates current head transmit packet descriptor.                                                                                                                                                           |
| head_txp              | The next packet descriptor to get used, along with its index. When head_txp and tail_txp are the same, the transmit queue is empty.                                                                          |
| tx_tail               | Indicates current tail transmit packet descriptor.                                                                                                                                                           |
| tail_txp              | The next packet descriptor to get sent, along with its index. When head_txp and tail_txp are the same, the transmit queue is empty.                                                                          |
| TX PD ring:           | Indicates the memory location of the beginning of buffer information for the transmit packet descriptor ring.                                                                                                |
| tx_head_pd            | Indicates current head packet descriptor.                                                                                                                                                                    |
| tx_tail_pd            | Indicates current tail packet descriptor.                                                                                                                                                                    |
| ehdr                  | Extended MCNS header.                                                                                                                                                                                        |
| <b>MIB Statistics</b> |                                                                                                                                                                                                              |
| DS fifo full          | Number of times the downstream input first-in first-out (FIFO) buffer became full on the router.                                                                                                             |
| rerequests            | Number of times a bandwidth request generated by the router was not responded to by the CMTS.                                                                                                                |
| DS mac msg overruns   | Number of times the router's DMA controller had a downstream MAC message and there were no free MAC message buffer descriptors to accept the message.                                                        |
| DS data overruns      | Number of times the router's DMA controller had downstream data and there were no free data PDU buffer descriptors to accept the data.                                                                       |
| Qualified maps        | Number of times a MAP message passed all filtering requirements and was received by the router.                                                                                                              |



**Table 178** *show controllers cable-modem Field Descriptions*

| Field                      | Description                                                                                                                                                                                              |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Qualified syncs            | Number of times a timestamp message was received by the router.                                                                                                                                          |
| CRC fails                  | Number of times a MAC message failed a cyclic redundancy check (CRC).                                                                                                                                    |
| HDR chk fails              | Number of times a MAC header failed its 16-bit CRC check. The MAC header CRC is a 16-bit Header Check Sequence (HCS) field that ensures the integrity of the MAC header even in a collision environment. |
| Data pdus                  | Total number of data protocol data units (PDUs) of all types received by the router.                                                                                                                     |
| Mac msgs                   | Number of MAC messages received by the router.                                                                                                                                                           |
| Valid hdrs                 | Number of valid headers received by the router, including PDU headers, MAC headers, and headers only.                                                                                                    |
| Global control and status: | Used to reset the BCM3300 chip.                                                                                                                                                                          |
| interrupts:                | Hexadecimal values of the pending IRQ interrupt and IRQ mask.                                                                                                                                            |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                          | Description                                                                                              |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem bpk</b>          | Displays information about the baseline privacy key management exchange between the router and the CMTS. |
| <b>show controllers cable-modem crypto des</b>   | Displays information about the DES engine registers.                                                     |
| <b>show controllers cable-modem filters</b>      | Displays the registers in the MAC hardware that are used for filtering received frames.                  |
| <b>show controllers cable-modem lookup-table</b> | Displays the mini-slot lookup table for the cable interface.                                             |
| <b>show controllers cable-modem mac</b>          | Displays detailed MAC-layer information for the cable interface.                                         |
| <b>show controllers cable-modem phy</b>          | Displays the contents of the registers used in the downstream physical hardware for the cable interface. |
| <b>show controllers cable-modem tuner</b>        | Displays the settings for the upstream and downstream tuners used by the cable interface.                |

# show controllers cable-modem bpkm

To display information about the Baseline Privacy Interface (BPI) or BPI Plus (BPI+) key management (BPKM) exchange between the router and the CMTS, use the **show controllers cable-modem bpkm** command in privileged EXEC mode.

**Cisco uBR904, Cisco uBR905, Cisco uBR924, and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter**

**show controllers cable-modem** *number* **bpkm**

| Syntax Description | <i>number</i> | Identifies the cable interface (always <b>0</b> ). |
|--------------------|---------------|----------------------------------------------------|
|--------------------|---------------|----------------------------------------------------|

| Defaults | No default behavior or values. |
|----------|--------------------------------|
|----------|--------------------------------|

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | Release    | Modification                                                                                                                                              |
|-----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router.                                                                                     |
|                 | 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.                                                                                               |
|                 | 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.                                                                                               |
|                 | 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.                                                                                               |
|                 | 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.                                                                                               |
|                 | 12.2(15)CZ | Support for DOCSIS 1.1 and BPI+ operation was added for the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

| Usage Guidelines | Baseline privacy key management exchanges take place only when both the router and the CMTS are running code images that support Baseline Privacy Interface (BPI) or BPI Plus (BPI+) encryption, and the privacy class of service is enabled via the configuration file that is downloaded to the router. Baseline privacy code images for the router contain k1, k8, or k9 in the code image name. |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Examples | The following shows typical output for the <b>show controllers cable-modem bpkm</b> command for DOCSIS 1.0 BPI operation when the CMTS does not have baseline privacy enabled: |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show controllers cable-modem 0 bpkm
```

```
CM Baseline Privacy Key Management
configuration (in seconds):
 authorization wait time: 10
 reauthorization wait time: 10
 authorization grace time: 600
 operational wait time: 1
 rekey wait time: 1
```

```

tek grace time: 600
authorization rej wait time: 60
kek state: STATE_B_AUTH_WAIT
sid 4:
tek state: No resources assigned

```

Table 179 describes the fields shown in the display.

**Table 179** *show controllers cable-modem bpkm Field Descriptions*

| Field                       | Description                                                                                                                                                                                                   |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| authorization wait time     | The number of seconds the router waits for a reply after sending the Authorization Request message to the CMTS.                                                                                               |
| reauthorization wait time   | The number of seconds the router waits for a reply after it has sent an Authorization Request message to the CMTS in response to a reauthorization request or an Authorization Invalid message from the CMTS. |
| authorization grace time    | The number of seconds before the current authorization is set to expire that the grace timer begins, signaling the router to begin the reauthorization process.                                               |
| operational wait time       | The number of seconds the Traffic Exchange Key (TEK) state machine waits for a reply from the CMTS after sending its initial Key Request for its SID's keying material.                                       |
| rekey wait time             | The number of seconds the TEK state machine waits for a replacement key for this Service ID (SID) after the TEK grace timer has expired and the request for a replacement key has been made.                  |
| tek grace time              | The number of seconds before the current TEK is set to expire that the TEK grace timer begins, signaling the TEK state machine to request a replacement key.                                                  |
| authorization rej wait time | Number of seconds the router waits before sending another Authorization Request message to the CMTS after it has received an Authorization Reject message.                                                    |
| kek state                   | The current state of the key encryption key that the CMTS uses to encrypt the traffic encryption keys it sends to the router. See Table 181 for the possible values.                                          |
| tek state                   | The current state of the traffic encryption key state machine for the specified SID. See Table 181 for the possible values.                                                                                   |

The following shows typical output for the **show controllers cable-modem bpkm** command for DOCSIS 1.1 BPI+ operation when baseline privacy is enabled:

Router# **show controllers cable-modem 0 bpkm**

```

CM Baseline Privacy Key Management
Privacy Version: BPI+ (PLUS)
 public key:
 30819F30 0D06092A 864886F7 0D010101 05000381 8D003081 89028181 00E560B2
 4F6777A1 731AF856 CE936615 BF513F15 44CE2D02 95167EAD 139FE25C C1E7D4E5
 99B34020 D96608B2 A87C0AA1 C171B265 3E87FF7F F70FD3B1 AE96F0EE B2E75172
 6B06F661 EA631817 0D317D6F 22FC733B F150E65F 44AE535A 5FB0532F 14519F3B
 80A9D442 05D7B7EF 58A5993C 49BB5028 9A3A980A 36AEDC53 E762FA4D 63020301 01
 keks: even 4184D17A0C0AEDA3 odd C07A8454DBAA7F1B
 hmac upstream key even:
 4E0A5108 A8451B24 BAC3A8CA D8DF459F 6D37448D

```

## ■ show controllers cable-modem bpkm

```

hmac upstream key odd:
 5D04EEDD 43129682 F7A474EA 4E9F888B 5EC18478
hmac downstream key even:
 7B6595D6 75B435FB 2FA7204D 2F203CB1 FBA80950
hmac downstream key odd:
 E15FC10B 7F1BAFE8 6295315F E91FE97C F0DE3A73
configuration (in seconds):
 authorization wait time: 5
 reauthorization wait time: 30
 authorization grace time: 60
 operational wait time: 2
 rekey wait time: 2
 tek grace time: 60
 authorization rej wait time: 60
 sa map wait time: 1
 sa map retries: 4
kek state: STATE_C_AUTHORIZED
kek life: 86450 sec
sid 2:
 tek state: STATE_D_OPERATIONAL
 tek life: 21654 sec
 keys: even 1730E9E1F0B1C4C, odd 23021AE604610E38
 ivectors: even 16FB0175256819FD, odd B802057107302F8
 sequence: 12
DSA map List

```

Router#

[Table 180](#) describes the fields shown in the display for BPI+ operation.

**Table 180** *show controllers cable-modem bpkm Field Descriptions (BPI+)*

| Field                     | Description                                                                                                                                                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Privacy Version           | Whether BPI or BPI+ is being run.                                                                                                                                                                             |
| public key                | The Diffie-Hellman public key that the router uses to establish a BPI+ session with the CMTS.                                                                                                                 |
| keks                      | The odd and even values for the key encryption key (KEK).                                                                                                                                                     |
| hmac upstream keys        | The odd and even values for the hash message authentication code (HMAC) key used in upstream key requests.                                                                                                    |
| hmac downstream keys      | The odd and even values for the HMAC message authentication key used in downstream key replies, key rejects, and invalid TEK messages.                                                                        |
| authorization wait time   | The number of seconds the router waits for a reply after sending the Authorization Request message to the CMTS.                                                                                               |
| reauthorization wait time | The number of seconds the router waits for a reply after it has sent an Authorization Request message to the CMTS in response to a reauthorization request or an Authorization Invalid message from the CMTS. |
| authorization grace time  | The number of seconds before the current authorization is set to expire that the grace timer begins, signaling the router to begin the reauthorization process.                                               |
| operational wait time     | The number of seconds the TEK state machine waits for a reply from the CMTS after sending its initial Key Request for its SID's keying material.                                                              |
| rekey wait time           | The number of seconds the TEK state machine waits for a replacement key for this SID after the TEK grace timer has expired and the request for a replacement key has been made.                               |

**Table 180** *show controllers cable-modem bpkm Field Descriptions (BPI+) (continued)*

| Field                       | Description                                                                                                                                                                          |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| tek grace time              | The number of seconds before the current TEK is set to expire that the TEK grace timer begins, signaling the TEK state machine to request a replacement key.                         |
| authorization rej wait time | Number of seconds the router waits before sending another Authorization Request message to the CMTS after it has received an Authorization Reject message.                           |
| sa map wait time            | Number of seconds the router waits for a response after sending a Security Association (SA) map request before timing out and resending the request.                                 |
| sa map retries              | Number of times the router attempts an SA map request before it rejects the attempt to create a new downstream service flow.                                                         |
| kek state                   | The current state of the key encryption key that the CMTS uses to encrypt the traffic encryption keys it sends to the router. See <a href="#">Table 181</a> for the possible values. |
| tek state                   | The current state of the traffic encryption key state machine for the specified SID. See <a href="#">Table 181</a> for the possible values.                                          |

[Table 181](#) describes the valid values for the kek state and tek state fields:

**Table 181** *State Values for KEK and TEK State Fields*

| State                                  | Description                                                                                                                                                                                                                       |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Key Encryption Key (KEK) States</b> |                                                                                                                                                                                                                                   |
| STATE_A_START                          | The router is still completing the DOCSIS provisioning process. If this state persists, it indicates that BPI/BPI+ encryption was not enabled for the router in its DOCSIS configuration file.                                    |
| STATE_B_AUTH_WAIT                      | DOCSIS provisioning has been completed, and the router has sent an authorization request to the CMTS and is waiting for a reply. If this state persists, it indicates that the CMTS has not enabled BPI/BPI+ operations.          |
| STATE_C_AUTHORIZED                     | The router has received a valid authorized reply from the CMTS, completing the KEK exchange, and allowing the TEK exchange to begin.                                                                                              |
| STATE_D_REAUTH_WAIT                    | The router sent a reauthorization request and is waiting for the reply from the CMTS. A reauthorization request can be sent if the initial request is rejected, or when existing keys have expired and must be reacquired.        |
| STATE_E_AUTH_REJ_WAIT                  | The router has received a nonpermanent authorization reject response from the CMTS and is waiting for the timeout period before sending another request.                                                                          |
| STATE_F_SILENT                         | The router has received a permanent authorization reject response from the CMTS and has been placed in silent mode, in which it does not pass traffic but does accept SNMP management requests. (Valid only for BPI+ operations.) |

**Table 181**      **State Values for KEK and TEK State Fields (continued)**

| State                                      | Description                                                                                                                                                                                                                                                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Traffic Encryption Key (TEK) States</b> |                                                                                                                                                                                                                                                                               |
| STATE_A_START                              | The router is still completing the DOCSIS provisioning process, or is still performing the KEK key exchange. If this state persists, it indicates that KEK authorization failed, or that BPI/BPI+ encryption was not enabled for the router in its DOCSIS configuration file. |
| STATE_B_OP_WAIT                            | The router has successfully completed the KEK key exchange, has sent a key request to the CMTS, and is waiting for a reply.                                                                                                                                                   |
| STATE_C_OP_REAUTH_WAIT                     | The router has sent a reauthorization request and is waiting for a reply, or the TEK key has been declared invalid. BPI/BPI+ encryption has not yet begun. If this state persists, it indicates that the TEK key exchange has failed.                                         |
| STATE_D_OPERATIONAL                        | The router has completed the TEK key exchange, and BPI or BPI+ encryption is operational between the router and the CMTS.                                                                                                                                                     |
| STATE_E_REKEY_WAIT                         | The existing TEK keys have expired, and the router has requested a key update from the CMTS.                                                                                                                                                                                  |
| STATE_F_REKEY_REAUTH_WAIT                  | The router has requested a key update from the CMTS and is waiting for a reply. BPI/BPI+ encryption can continue using the existing keys until they expire.                                                                                                                   |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                          | Description                                                                                              |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem</b>              | Displays high-level controller information about the cable interface.                                    |
| <b>show controllers cable-modem crypto des</b>   | Displays information about the DES engine registers.                                                     |
| <b>show controllers cable-modem filters</b>      | Displays the registers in the MAC hardware that are used for filtering received frames.                  |
| <b>show controllers cable-modem lookup-table</b> | Displays the mini-slot lookup table inside the cable interface.                                          |
| <b>show controllers cable-modem mac</b>          | Displays detailed MAC-layer information for the cable interface.                                         |
| <b>show controllers cable-modem phy</b>          | Displays the contents of the registers used in the downstream physical hardware for the cable interface. |
| <b>show controllers cable-modem tuner</b>        | Displays the settings for the upstream and downstream tuners used by the cable interface.                |

# show controllers cable-modem classifiers

To display the DOCSIS 1.1 classifiers currently in use on the router, use the **show controllers cable-modem classifiers** command in privileged EXEC mode.

Cisco uBR905 and uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

**show controllers cable-modem** *number* **classifiers** [*classifier-id* | **summary**]

|                    |                      |                                                                                           |
|--------------------|----------------------|-------------------------------------------------------------------------------------------|
| Syntax Description | <i>number</i>        | Identifies the cable interface (always <b>0</b> ).                                        |
|                    | <i>classifier-id</i> | (Optional) Displays information for a specific classifier. The valid range is 1 to 65535. |
|                    | <b>summary</b>       | (Optional) Displays a brief summary of all classifiers.                                   |

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |                |                                                                                                                                   |
|-----------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                                                                                               |
|                 | 12.2(15)CZ     | This command was introduced for the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

|                  |                                                                                                                                                                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command displays the classifiers that are currently defined for both the upstream and downstream. The information shown corresponds to the Quality of Service classifier parameters that are listed in Appendix C of the DOCSIS 1.1 specification. |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                         |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows typical output for both upstream and downstream classifiers on the <b>show controllers cable-modem classifiers</b> command: |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show controllers cable-modem 0 classifiers
```

```
Upstream Packet Classifiers parameters
Classifier Reference: 1
Classifier ID: 2
Service Flow Reference: 1
Service Flow ID: 101
Rule Priority: 0
Activation State: 1
Dynsrv Change Action: 0
SID: 90
IP classifiers:
ToS: 0x1 0x3 0xFF
Protocol: 258
Source Address: 0.0.0.0
Source Mask: 255.255.255.255
Destination Address: 0.0.0.0
Destination Mask: 255.255.255.255
Source Port Start: 65
Source Port End: 65
Destination Port Start: 0
```

## ■ show controllers cable-modem classifiers

```

 Destination Port End: 65535
LLC Classifiers:
 Destination MAC address: 0:0:0:0:0:0:0:0:0:0:0
Source MAC address: 0:0:0:0:0:0
 Ether Type: 0x0 0x0 0x0

Downstream Packet Classifiers parameters
 Classifier Reference: 1
 Classifier ID: 1
 Service Flow Reference: 6
 Service Flow id: 5
 Rule Priority: 22
 Activation State: 1
 Dynsrv Change Action: 0
 SID: 0

IP classifiers
 Tos: 0x1 0x3 0xFF
 Protocol: 258
 Source Address: 0.0.0.0
 Source Mask: 255.255.255.255
 Destination Address: 0.0.0.0
 Destination Mask: 255.255.255.255
 Source Port Start: 0
 Source Port End: 65535
 Destination Port Start: 0
 Destination Port End: 65535
LLC Classifiers
 Source MAC address: 0:0:0:0:0:0
 Ether Type: 0x0 0x0 0x0

Downstream Packet Classifiers parameters
 Classifier Reference: 2
 Classifier ID: 2
 Service Flow Reference: 7
 Service Flow id: 6
 Rule Priority: 23
 Activation State: 1
 Dynsrv Change Action: 0
 SID: 0

IP classifiers
 Tos: 0x5 0x5 0xD
 Protocol: 258
 Source Address: 0.0.0.0
 Source Mask: 255.255.255.255
 Destination Address: 0.0.0.0
 Destination Mask: 255.255.255.255
 Source Port Start: 0
 Source Port End: 65535
LLC Classifiers
 Destination MAC address: 0:0:0:0:0:0:0:0:0:0:0
 Source MAC address: 0:0:0:0:0:0
 Ether Type: 0x0 0x0 0x0

Downstream Packet Classifiers parameters
 Classifier Reference: 3
 Classifier ID: 3
 Service Flow Reference: 8
 Service Flow id: 7
 Rule Priority: 24
 Activation State: 1
 Dynsrv Change Action: 0
 SID: 0

```



```

IP classifiers
 Tos: 0x8 0xFF 0xF8
 Protocol: 258
 Source Address: 0.0.0.0
 Source Mask: 255.255.255.255
 Destination Address: 0.0.0.0
 Destination Mask: 255.255.255.255
 Source Port Start: 0
 Source Port End: 65535
 Destination Port Start: 0
 Destination Port End: 65535
LLC Classifiers
 Destination MAC address: 0:0:0:0:0:0:0:0:0:0:0
 Source MAC address: 0:0:0:0:0:0
 Ether Type: 0x0 0x0 0x0
Router#

```

The following shows the typical display for the **summary** option:

```
Router# show controllers cable-modem 0 classifiers summary
```

| SFID | SF  | Classifier | Classifier | Rule     | State  |
|------|-----|------------|------------|----------|--------|
|      | Ref | ID         | Ref        | priority |        |
| 675  | 1   | 4          | 10         | 0        | active |
| 676  | 2   | 8          | 11         | 0        | active |
| 1911 | 3   | 3          | 12         | 0        | active |
| 1914 | 4   | 7          | 13         | 0        | active |
| 1912 | 5   | 2          | 14         | 0        | active |
| 1915 | 6   | 6          | 15         | 0        | active |
| 1913 | 7   | 1          | 16         | 0        | active |
| 1916 | 8   | 5          | 17         | 0        | active |

```
Router#
```

The following shows the detailed information that is displayed for a specific classifier:

```
Router# show controllers cable-modem 0 classifiers 4
```

```

Upstream Packet Classifiers parameters
 Classifier Reference: 10
 Classifier ID: 4
 Service Flow Reference: 1
 Service Flow ID: 675
 Rule Priority: 0
 Activation State: 1
 Dynsrv Change Action: 0
 SID: 565
IP classifiers:
 ToS: 0x0 0x0 0x0
 Protocol: 258
 Source Address: 12.0.0.1
 Source Mask: 255.255.255.255
 Destination Address: 6.0.0.1
 Destination Mask: 255.255.255.255
 Source Port Start: 0
 Source Port End: 65535
 Destination Port Start: 0
 Destination Port End: 65535
LLC Classifiers:
 Destination MAC address: 0:0:0:0:0:0:0:0:0:0:0
 Source MAC address: 0:0:0:0:0:0
 Ether Type: 0x0 0x0 0x0

```

Table 182 describes the fields shown in the display.

**Table 182** *show controllers cable-modem classifiers Field Descriptions*

| Field                                           | Description                                                                                                                                                                                                                 |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Classifier Reference, Classifier Ref            | The reference ID to uniquely identify the classifier in the DOCSIS configuration file and MAC management messages.                                                                                                          |
| Classifier ID                                   | The ID used to uniquely identify the classifier in each service flow.                                                                                                                                                       |
| Service Flow Reference, SF Ref                  | The reference ID that uniquely identifies the service flow.                                                                                                                                                                 |
| Service Flow ID, SFID                           | The ID that uniquely identifies the service flow.                                                                                                                                                                           |
| Rule Priority                                   | The priority assigned to the classifier, 0 to 255, with a higher value indicating a higher priority.                                                                                                                        |
| Activation State, State                         | Whether the classifier is activate (1) or inactive (0).                                                                                                                                                                     |
| Dynsrv Change Action                            | The action taken for this classifier in dynamic service change messages: <ul style="list-style-type: none"> <li>0 = Add the classifier.</li> <li>1 = Replace the classifier.</li> <li>2 = Delete the classifier.</li> </ul> |
| SID                                             | The service ID (SID) associated with this classifier.                                                                                                                                                                       |
| <b>IP Classifiers</b>                           |                                                                                                                                                                                                                             |
| ToS                                             | The matching Type of Service (Tos) low byte, high byte, and masking value.                                                                                                                                                  |
| Protocol                                        | The matching IP protocol type, as given in <a href="#">RFC 1700</a> . A value of 256 matches any IP protocol, and a value of 257 matches TCP and UDP traffic.                                                               |
| Source Address and Source Mask                  | The matching IP source address, where the source address is ANDed with the source mask to specify the valid range of source addresses.                                                                                      |
| Destination Address and Destination Mask        | The matching IP destination address, where the destination address is ANDed with the destination mask to specify the valid range of destination addresses.                                                                  |
| Source Port Start and Source Port End           | The low end and high end matching source TCP/UDP port values.                                                                                                                                                               |
| Destination Port Start and Destination Port End | The low end and high end matching destination TCP/UDP port values.                                                                                                                                                          |
| <b>LLC Classifiers</b>                          |                                                                                                                                                                                                                             |
| Destination MAC address                         | The six-byte matching MAC destination address and six-byte mask. The first six bytes (address) are ANDed with the last six bytes (mask) to specify the valid range of MAC destination addresses.                            |

**Table 182** *show controllers cable-modem classifiers Field Descriptions*

| Field              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source MAC address | The six-byte matching MAC source address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Ether Type         | <p>The one-byte Ethernet protocol type and two-byte matching layer 3 protocol ID in the Ether frame. The first byte can have the following values, which control the meaning of the following two bytes:</p> <ul style="list-style-type: none"> <li>0x00 = no matching Ethernet protocol is required.</li> <li>0x01 = Ethertype DIX or SNAP frames that match the two-byte packet type.</li> <li>0x02 = non-SNAP IEEE 802.2 encapsulation frames that match the eight-bit packet type.</li> <li>0x03 = MAC Management Messages with a type field between the two bytes, except that RNG_RSP, REG_REQ, REG_RSP, and REG_ACK frames are always matched.</li> <li>0x04 = matches all data PDU packets, regardless of the two-byte protocol ID.</li> </ul> |

#### Related Commands

| Command                                           | Description                                                                                                      |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem phs</b>           | Displays the currently defined parameters for Payload Header Suppression (PHS) for the router.                   |
| <b>show controllers cable-modem reg-rsp</b>       | Displays the information contained in the registration response (REG-RSP) message that the CMTS sent the router. |
| <b>show controllers cable-modem service-flows</b> | Displays the parameters for each of the service flows defined on the router's upstream and downstream.           |

# show controllers cable-modem cmcert

To display the router's public key X.509 certificate, use the **show controllers cable-modem cmcert** command in privileged EXEC mode.

**Cisco uBR905 and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter**

**show controllers cable-modem *number* cmcert**

| Syntax Description | <i>number</i> | Identifies the cable interface (always 0). |
|--------------------|---------------|--------------------------------------------|
|--------------------|---------------|--------------------------------------------|

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | Release    | Modification                                                                                                                     |
|-----------------|------------|----------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)CZ | This command was introduced on the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

| Usage Guidelines | This command displays the router's X.509 DOCSIS cable-modem certificate, which uniquely identifies the router during the BPI+ negotiation process. This command shows the individual X.509 components of the certificate, starting with the DOCSIS restricted X.501 Distinguished Name and ending with the 1024-bit public key. |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## Tip

This command displays the certificate that is burned into the router at the factory and is not normally changed. The **show controllers cable-modem manuf-cert** command displays the manufacturer's certificate that is incorporated into the Cisco IOS image that the router is currently running. Upgrading the Cisco IOS image could also update the manufacturer's certificate.

| Examples | The following example shows the starting lines and ending lines of typical output for the <b>show controllers cable-modem cmcert</b> command: |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------|
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show controllers cable-modem 0 cmcert
```

```
Cable Modem Certificate:
SEQ(878)
 SEQ(727)
 Context-specific [A0](3)
 INT(1):2
 END
 INT(10): 62 E0 07 47 00 00 00 00 FA 62
1w3d: SEQ(13)
 OID(9):SHA Signature 1.2.840.113549.1.1.5
1w3d: NULL
 END
 SEQ(114)
 SET(11)
 SEQ(9)
```

```

 OID(3):Country 2.5.4.6
1w3d: PRT(2):US
 END
 END
 SET(22)
 SEQ(20)
 OID(3):Organization 2.5.4.10
1w3d: PRT(13):Cisco Systems
 END
 END
 SET(15)
 SEQ(13)
 OID(3):Organization Unit 2.5.4.11
1w3d: PRT(6):DOCSIS
 END
 END
 SET(58)
 SEQ(56)
 OID(3):Common Name 2.5.4.3
1w3d: PRT(49):Cisco Cable Modem Root Certificate Authority R
 END
 END
...
1w3d: C7 9A A8 5C BD F3 30 5A E5 B6 66 1F 1E 3A C9 2E
1w3d: 04 5D B5 57 3E 75 ED A3 0A AB B6 5D 73 87 E9 BE
1w3d: ED 1A 68 7B B3 08 DA 0F E9 AA 05 28 E2 61 1B 3D
1w3d: END

```

Router#



**Note**

You must manually enter a return to redisplay the router prompt after the certificate has been displayed.

**Related Commands**

| Command                                            | Description                                                   |
|----------------------------------------------------|---------------------------------------------------------------|
| <b>show controllers cable-modem<br/>manuf-cert</b> | Displays the manufacturer's X.509 certificate for the router. |

# show controllers cable-modem crypto des

To display information about the Data Encryption Standard (DES) engine registers, use the **show controllers cable-modem des** command in privileged EXEC mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show controllers cable-modem *number* crypto des**

| <b>Syntax Description</b> | <i>number</i> Identifies the cable interface (always <b>0</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |              |           |                                                                                                                     |            |                                                             |           |                                                             |            |                                                             |           |                                                             |           |                                                                              |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-----------|---------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------|-----------|-------------------------------------------------------------|------------|-------------------------------------------------------------|-----------|-------------------------------------------------------------|-----------|------------------------------------------------------------------------------|
| <b>Command Modes</b>      | Privileged EXEC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |              |           |                                                                                                                     |            |                                                             |           |                                                             |            |                                                             |           |                                                             |           |                                                                              |
| <b>Command History</b>    | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>11.3(4)NA</td><td>This command was introduced, as <b>show controllers cable-modem des</b>, for the Cisco uBR904 cable access router.</td></tr> <tr> <td>12.0(4)XI1</td><td>Support was added for the Cisco uBR924 cable access router.</td></tr> <tr> <td>12.1(3)XL</td><td>Support was added for the Cisco uBR905 cable access router.</td></tr> <tr> <td>12.1(5)XU1</td><td>Support was added for the Cisco CVA122 Cable Voice Adapter.</td></tr> <tr> <td>12.2(2)XA</td><td>Support was added for the Cisco uBR925 cable access router.</td></tr> <tr> <td>12.2(X)BC</td><td>This command was renamed to <b>show controllers cable-modem crypto des</b>.</td></tr> </table> | Release | Modification | 11.3(4)NA | This command was introduced, as <b>show controllers cable-modem des</b> , for the Cisco uBR904 cable access router. | 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router. | 12.1(3)XL | Support was added for the Cisco uBR905 cable access router. | 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter. | 12.2(2)XA | Support was added for the Cisco uBR925 cable access router. | 12.2(X)BC | This command was renamed to <b>show controllers cable-modem crypto des</b> . |
| Release                   | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |              |           |                                                                                                                     |            |                                                             |           |                                                             |            |                                                             |           |                                                             |           |                                                                              |
| 11.3(4)NA                 | This command was introduced, as <b>show controllers cable-modem des</b> , for the Cisco uBR904 cable access router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |              |           |                                                                                                                     |            |                                                             |           |                                                             |            |                                                             |           |                                                             |           |                                                                              |
| 12.0(4)XI1                | Support was added for the Cisco uBR924 cable access router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |              |           |                                                                                                                     |            |                                                             |           |                                                             |            |                                                             |           |                                                             |           |                                                                              |
| 12.1(3)XL                 | Support was added for the Cisco uBR905 cable access router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |              |           |                                                                                                                     |            |                                                             |           |                                                             |            |                                                             |           |                                                             |           |                                                                              |
| 12.1(5)XU1                | Support was added for the Cisco CVA122 Cable Voice Adapter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |              |           |                                                                                                                     |            |                                                             |           |                                                             |            |                                                             |           |                                                             |           |                                                                              |
| 12.2(2)XA                 | Support was added for the Cisco uBR925 cable access router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |              |           |                                                                                                                     |            |                                                             |           |                                                             |            |                                                             |           |                                                             |           |                                                                              |
| 12.2(X)BC                 | This command was renamed to <b>show controllers cable-modem crypto des</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |              |           |                                                                                                                     |            |                                                             |           |                                                             |            |                                                             |           |                                                             |           |                                                                              |

**Examples** The following shows typical output for the **show controllers cable-modem crypto des** command.

```
Router# show controllers cable-modem 0 crypto des
downstream des:
 ds_des_key_table:
 key 0: even 0, odd 0
 key 1: even 0, odd 0
 key 2: even 0, odd 0
 key 3: even 0, odd 0
 ds_des_cbc_iv_table:
 iv 0: even 0, odd 0
 iv 1: even 0, odd 0
 iv 2: even 0, odd 0
 iv 3: even 0, odd 0
 ds_des_sid_table:
 sid_1=0x0000, sid_2=0x0000, sid_3=0x0000, sid_4=0x0000
 ds_des_sid_enable=0x80, ds_des_ctrl=0x2E
 ds_des_sv=0x0F00
 ds_unencrypted_length=0x0C
upstream des:
 us_des_key_table:
 key 0: even 0, odd 0
 key 1: even 0, odd 0
 key 2: even 0, odd 0
 key 3: even 0, odd 0
 us_des_cbc_iv_table:
 iv 0: even 0, odd 0
```

```

iv 1: even 0, odd 0
iv 2: even 0, odd 0
iv 3: even 0, odd 0
pb_req_bytes_to_minislots=0x10
us_des_ctrl=0x00, us_des_sid_1= 0x1234
ds_unencrypted_length=0x0C

```

Router#

[Table 183](#) describes the significant fields shown in the display. For more information, see the Broadcom documentation for the BCM3300 chip.

**Table 183** *show controllers cable-modem crypto des Field Descriptions*

| Field                 | Description                                                                                                                                                                                                                                                            |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ds_des_key_table      | Displays a table showing the downstream DES keys.                                                                                                                                                                                                                      |
| ds_des_cbc_iv_table   | Displays a table showing the downstream DES Cipher Block Chaining (CBC) mode information.                                                                                                                                                                              |
| ds_des_sid_table      | Displays a table showing the SID values to be enabled for DES encryption.                                                                                                                                                                                              |
| ds_des_sid_enable     | Identifies which SID entries in the SID table are enabled for encryption. In the above example, none of the entries are enabled for encryption.                                                                                                                        |
| ds_des_ctrl           | Control register that identifies the operating mode of the downstream DES engine.                                                                                                                                                                                      |
| ds_des_sv             | Displays the DES security version register; the range of the version field in the Baseline Privacy Interface (BPI) extended headers that will be accepted by the hardware. High byte is upper limit, low byte is lower limit. The router will accept versions 0 to 15. |
| ds_unencrypted_length | Specifies the number of bytes that will be unencrypted at the beginning of the MAC frame. 0x0C means the first 12 bytes are not encrypted, which is what the DOCSIS Baseline Privacy specification calls for.                                                          |
| us_des_key_table      | Displays a table showing upstream DES keys.                                                                                                                                                                                                                            |
| us_des_cbc_iv_table   | Displays a table of upstream DES CBC mode information.                                                                                                                                                                                                                 |
| us_des_ctrl           | Control register that controls the operating mode of the upstream DES engine. The value 0x24 means that the upstream is configured to enable decryption and to use CBC mode.                                                                                           |



**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                     | Description                                                                                                       |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem</b>         | Displays high-level controller information about the cable interface.                                             |
| <b>show controllers cable-modem bpk</b>     | Displays information about the baseline privacy key management exchange between the cable interface and the CMTS. |
| <b>show controllers cable-modem filters</b> | Displays the registers in the MAC hardware that are used for filtering received frames.                           |

|                                                  |                                                                                                          |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem lookup-table</b> | Displays the mini-slot lookup table for the cable interface.                                             |
| <b>show controllers cable-modem mac</b>          | Displays detailed MAC-layer information for the cable interface.                                         |
| <b>show controllers cable-modem phy</b>          | Displays the contents of the registers used in the downstream physical hardware for the cable interface. |
| <b>show controllers cable-modem tuner</b>        | Displays the settings for the upstream and downstream tuners used by the cable interface.                |



# show controllers cable-modem filters

To display the registers in the MAC hardware that are used for filtering received frames, use the **show controllers cable-modem filters** command in privileged EXEC mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show controllers cable-modem *number* filters**

|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> Identifies the cable interface (always <b>0</b> ). |
|---------------------------|------------------------------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                   |
|------------------------|----------------|-----------------------------------------------------------------------|
|                        | 11.3(4)NA      | This command was introduced for the Cisco uBR904 cable access router. |
|                        | 12.0(4)XI1     | Support was added for the Cisco uBR924 cable access router.           |
|                        | 12.1(3)XL      | Support was added for the Cisco uBR905 cable access router.           |
|                        | 12.1(5)XU1     | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                        | 12.2(2)XA      | Support was added for the Cisco uBR925 cable access router.           |

|                         |                                                                                                            |
|-------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Some of the filtering parameters are MAC hardware addresses, Service IDs (SIDs), and upstream channel IDs. |
|-------------------------|------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following shows typical MAC and SID filter information displayed by the <b>show controllers cable-modem filters</b> command: |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|

```
Router# show controllers cable-modem 0 filters

downstream mac message processing:
 ds_mac_da_filters:
 filter_1=0010.7b43.aa01, filter_2=0000.0000.0000
 filter_3=0000.0000.0000, filter_4=0000.0000.0000
 ds_mac_da_filter_ctrl=0x71, ds_mac_msg_sof=0x0000
 ds_mac_da_mc=01E02F00
 map_parser_sids:
 sid_1=0x0000, sid_2=0x0000, sid_3=0x0000, sid_4=0x0000
 ds_mac_filter_ctrl=0x00, us_channel_id=0x0000
 ds_pid=0x0000, mac_msg_proto_ver=FF 00
 reg_rang_req_sid=0x0000
downstream data processing:
 ds_data_da_filter_table:
 filter_1 0010.7b43.aa01, filter_2 0000.0000.0000
 filter_3 0000.0000.0000, filter_4 0000.0000.0000
 ds_data_da_filter_ctrl=0x61, ds_pdu_sof=0xDEAD
 ds_data_da_mc=01000000
upstream processing:
 us_ctrl_status=0x04, Minislots per request=0x01
```

## show controllers cable-modem filters

```
burst_maps:
 map[0]=0 map[1]=0 map[2]=0 map[3]=0
bytes_per_minislot_exp=0x04
us_map_parser_minislot_adv=0x03, ticks_per_minislot=0x08, maint_xmit=0x0001
us_sid_table:
 sid_1=0x0000, sid_2=0x0000, sid_3=0x0000, sid_4=0x0000
max_re_req=0x0010, rang_fifo=0x00
Router#
```

Table 184 describes the fields shown in the display. For more information, see the Broadcom documentation for the BCM3300 chip.

**Table 184** *show controllers cable-modem filters Field Descriptions*

| Field                   | Description                                                                                |
|-------------------------|--------------------------------------------------------------------------------------------|
| ds_mac_da_filters       | MAC address of the cable interface and the MAC address of any Ethernet MAC it is bridging. |
| ds_mac_da_filter_ctrl   | Downstream MAC filter control for data.                                                    |
| ds_mac_msg_sof          | Downstream MAC message start of frame.                                                     |
| ds_mac_da_mc            | Downstream MAC control filter for data.                                                    |
| map_parser_sids         | Service IDs used for upstream bandwidth allocation.                                        |
| ds_mac_filter_ctrl      | Downstream MAC filter control for MAC messages.                                            |
| us_channel_id           | Upstream channel ID.                                                                       |
| ds_pid                  | Downstream packet ID.                                                                      |
| mac_msg_proto_ver       | Version of the MAC management protocol in use.                                             |
| reg_rang_req_sid        | Service ID (SID) field of the ranging request message.                                     |
| ds_data_da_filter_table | Downstream data processing filter table.                                                   |
| ds_data_da_filter_ctrl  | Downstream data processing filter control.                                                 |
| ds_pdu_sof              | Downstream PDU start of frame.                                                             |
| ds_data_da_mc           | Downstream data processing MAC control.                                                    |
| us_ctrl_status          | Upstream control status.                                                                   |
| Minislots per request   | Length of each registration request in mini-slots.                                         |
| burst_maps              | Maps the burst profiles saved in the BCM3037 registers to interval usage codes (IUCs).     |
| bytes_per_minislot_exp  | Number of bytes per expansion mini-slot.                                                   |
| ticks_per_minislot      | Number of time ticks (6.25-microsecond intervals) in each upstream mini-slot.              |
| maint_xmit              | Number of initial maintenance transmit opportunities.                                      |
| us_sid_table            | Upstream service ID table.                                                                 |
| max_re_req              | Maximum number of registration re-requests allowed.                                        |
| rang_fifo               | Number of ranging requests that can be held in the first-in-first-out (FIFO) buffer.       |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                          | Description                                                                                                       |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem</b>              | Displays high-level controller information about the cable interface.                                             |
| <b>show controllers cable-modem bpk</b>          | Displays information about the baseline privacy key management exchange between the cable interface and the CMTS. |
| <b>show controllers cable-modem crypto des</b>   | Displays information about the Data Encryption Standard (DES) engine registers.                                   |
| <b>show controllers cable-modem lookup-table</b> | Displays the mini-slot lookup table for the cable interface.                                                      |
| <b>show controllers cable-modem mac</b>          | Displays detailed MAC-layer information for the cable interface.                                                  |
| <b>show controllers cable-modem phy</b>          | Displays the contents of the registers used in the downstream physical hardware for the cable interface.          |
| <b>show controllers cable-modem tuner</b>        | Displays the settings for the upstream and downstream tuners used for the cable interface.                        |

# show controllers cable-modem lookup-table

To display the mini-slot lookup table for the router's cable interface, use the **show controllers cable-modem lookup-table** command in privileged EXEC mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show controllers cable-modem *number* lookup-table**

|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> Identifies the cable interface (always <b>0</b> ). |
|---------------------------|------------------------------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

|                        |                |                                                                       |
|------------------------|----------------|-----------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                   |
|                        | 11.3(4)NA      | This command was introduced for the Cisco uBR904 cable access router. |
|                        | 12.0(4)XI1     | Support was added for the Cisco uBR924 cable access router.           |
|                        | 12.1(3)XL      | Support was added for the Cisco uBR905 cable access router.           |
|                        | 12.1(5)XU1     | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                        | 12.2(2)XA      | Support was added for the Cisco uBR925 cable access router.           |

**Usage Guidelines** This command displays the details of the lookup table. The driver uses this table to convert the size of the packets that the router wants to transmit into a bandwidth request to the CMTS in mini-slots. The contents of this table are affected by the upstream symbol rate that is negotiated between the CMTS and the cable access router.

Use this table to look up the packet size and determine how many mini-slots will be needed.

**Examples** The following shows a typical mini-slot lookup table as displayed by the **show controllers cable-modem lookup-table** command:

```
Router# show controllers cable-modem 0 lookup-table

Max Burst Size (minislots) = 0x6
Max Burst Length (bytes) = 0x4B

PHY Overhead Lookup Table:

000: 01 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06
010: 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06
020: 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06
030: 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06
040: 06 06 06 06 06 06 06 06 06 06 06 06 06 10 10 10
050: 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
060: 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
070: 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
080: 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
090: 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
```

Cisco IOS CMTS Cable Command Reference

# show controllers cable-modem lookup-table

```

4A0: 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4B0: 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4C0: 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4D0: 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4E0: 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4F0: 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
500: 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
510: 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
520: 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 68 68 68 68 68 68
530: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
540: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
550: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
560: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
570: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
580: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
590: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5A0: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5B0: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5C0: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5D0: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5E0: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5F0: 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
600: 68 68 68 68 68 77 77 77 77 77 77 77 77 77
610: 77 77 77 77 77 77 77 77 77 77 77 77 77 77
620: 77 77 77 77 77 77 77 77 77 77 77 77 77 77
630: 77 77 77 77 77 77 77 77 77 77 77 77 77 77

```

## PHY Reverse Lookup Table:

```

00: 0000 0000 0000 0000 0000 0000 004B 0000
08: 0000 0000 0000 0000 0000 0000 0000 0000
10: 00DC 00DC 00DC 00DC 00DC 00DC 00DC 00DC
18: 00DC 00DC 00DC 00DC 00DC 00DC 00DC 01B8
20: 01B8 01B8 01B8 01B8 01B8 01B8 01B8 01B8
28: 01B8 01B8 01B8 01B8 01B8 0294 0294 0294
30: 0294 0294 0294 0294 0294 0294 0294 0294
38: 0294 0294 0294 0294 0370 0370 0370 0370
40: 0370 0370 0370 0370 0370 0370 0370 0370
48: 0370 0370 0370 044C 044C 044C 044C 044C
50: 044C 044C 044C 044C 044C 044C 044C 044C
58: 044C 044C 0528 0528 0528 0528 0528 0528
60: 0528 0528 0528 0528 0528 0528 0528 0528
68: 0604 0604 0604 0604 0604 0604 0604 0604
70: 0604 0604 0604 0604 0604 0604 0604 06E0
78: 06E0 06E0 06E0 06E0 06E0 06E0 06E0 06E0
80: 06E0 06E0 06E0 06E0 06E0 06E0 07BC 07BC
88: 07BC 07BC 07BC 07BC 07BC 07BC 07BC 07BC
90: 07BC 07BC 07BC 07BC 07BC 0898 0898 0898
98: 0898 0898 0898 0898 0898 0898 0898 0898
A0: 0898 0898 0898 0974 0974 0974 0974 0974
A8: 0974 0974 0974 0974 0974 0974 0974 0974
B0: 0974 0974 0A50 0A50 0A50 0A50 0A50 0A50
B8: 0A50 0A50 0A50 0A50 0A50 0A50 0A50 0A50
C0: 0A50 0B2C 0B2C 0B2C 0B2C 0B2C 0B2C 0B2C
C8: 0B2C 0B2C 0B2C 0B2C 0B2C 0B2C 0B2C 0B2C
D0: 0C08 0C08 0C08 0C08 0C08 0C08 0C08 0C08
D8: 0C08 0C08 0C08 0C08 0C08 0C08 0CE4 0CE4
E0: 0CE4 0CE4 0CE4 0CE4 0CE4 0CE4 0CE4 0CE4
E8: 0CE4 0CE4 0CE4 0CE4 0CE4 0DC0 0DC0 0DC0
F0: 0DC0 0DC0 0DC0 0DC0 0DC0 0DC0 0DC0 0DC0
F8: 0DC0 0DC0 0DC0 0DC0 0E9C 0E9C 0E9C 0E9C

```

Router#


**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                        | Description                                                                                                       |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem</b>            | Displays high-level controller information about the cable interface.                                             |
| <b>show controllers cable-modem bpk</b>        | Displays information about the baseline privacy key management exchange between the cable interface and the CMTS. |
| <b>show controllers cable-modem crypto des</b> | Displays information about the Data Encryption Standard (DES) engine registers.                                   |
| <b>show controllers cable-modem filters</b>    | .Displays the registers in the MAC hardware that are used for filtering received frames.                          |
| <b>show controllers cable-modem mac</b>        | Displays detailed MAC-layer information for the cable interface.                                                  |
| <b>show controllers cable-modem phy</b>        | Displays the contents of the registers used in the downstream physical hardware of the cable interface.           |
| <b>show controllers cable-modem tuner</b>      | Displays the settings for the upstream and downstream tuners used by the cable interface.                         |

# show controllers cable-modem mac

To display detailed MAC-layer information for the router's cable interface, use the **show controllers cable-modem mac** command in privileged EXEC mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show controllers cable-modem *number* mac {errors | hardware | log | resets | state}**

| Syntax Description |                                                                                                                                                                |  |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <i>number</i>      | Identifies the cable interface (always <b>0</b> ).                                                                                                             |  |
| <b>errors</b>      | Displays a log of the error events that are reported to SNMP. This keyword enables you to look at the error events without accessing a MIB.                    |  |
| <b>hardware</b>    | Displays all MAC hardware registers.                                                                                                                           |  |
| <b>log</b>         | Displays a history of MAC log messages, up to 1023 entries. This is the same output that is displayed when using the <b>debug cable-modem mac log</b> command. |  |
| <b>resets</b>      | Extracts all of the reset causes out of the MAC log file and summarizes them in a mini report.                                                                 |  |
| <b>state</b>       | Displays a summary of the MAC state.                                                                                                                           |  |

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | Release    | Modification                                                                                                                                                                         |
|-----------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router.                                                                                                                |
|                 | 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.                                                                                                                          |
|                 | 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.                                                                                                                          |
|                 | 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.                                                                                                                          |
|                 | 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.                                                                                                                          |
|                 | 12.2(15)CZ | Support for DOCSIS 1.1 and BPI+ operation was added to the <b>state</b> option for the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

| Usage Guidelines | <p>MAC log messages are written to a circular log file even when debugging is not turned on. These messages include timestamps, events, and information pertinent to these events. Use the <b>show controllers cable-modem mac log</b> command to view MAC log messages.</p> <p>If the router interface fails to come up or resets periodically, the MAC log will capture what happened. For example, if an address is not obtained from the DHCP server, an error is logged, initialization starts over, and the router scans for a downstream frequency.</p> <p>The most useful keywords for troubleshooting a router are <b>log</b>, <b>errors</b>, and <b>resets</b>. See the following examples for typical outputs for these options.</p> |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



**Examples**

The following shows a typical display of the MAC log file for a cable interface that has successfully registered with the CMTS:

```
Router# show controllers cable-modem 0 mac log

00:14:24: 864.124 CMAC_LOG_DRIVER_INIT_IDB_RESET 0x080B7430
00:14:24: 864.128 CMAC_LOG_LINK_DOWN
00:14:24: 864.132 CMAC_LOG_RESET_FROM_DRIVER
00:14:24: 864.134 CMAC_LOG_STATE_CHANGE wait_for_link_up_state
00:14:24: 864.138 CMAC_LOG_LINK_UP
00:14:24: 864.142 CMAC_LOG_STATE_CHANGE ds_channel_scanning_state
00:14:24: 864.270 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
81/453000000/855000000/6000000
00:14:24: 864.276 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
82/930000000/105000000/6000000
00:14:24: 864.280 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
83/111025000/117025000/6000000
00:14:24: 864.286 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
84/231012500/327012500/6000000
00:14:24: 864.290 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
85/333025000/333025000/6000000
00:14:24: 864.294 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
86/339012500/399012500/6000000
00:14:24: 864.300 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
87/405000000/447000000/6000000
00:14:24: 864.304 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
88/123012500/129012500/6000000
00:14:24: 864.310 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
89/135012500/135012500/6000000
00:14:24: 864.314 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
90/141000000/171000000/6000000
00:14:24: 864.320 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
91/219000000/225000000/6000000
00:14:24: 864.324 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
92/177000000/213000000/6000000
00:14:24: 864.330 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
93/55752700/67753300/6000300
00:14:24: 864.334 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
94/79753900/85754200/6000300
00:14:24: 864.340 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
95/175758700/211760500/6000300
00:14:24: 864.344 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
96/121756000/169758400/6000300
00:14:24: 864.348 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
97/217760800/397769800/6000300
00:14:24: 864.354 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
98/73753600/115755700/6000300
00:14:24: 864.358 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND
99/403770100/997799800/6000300
00:14:24: 864.364 CMAC_LOG_WILL_SEARCH_SAVED_DS_FREQUENCY 213000000
00:14:25: 865.450 CMAC_LOG_UCD_MSG_RCVD 1
00:14:25: %LINK-3-UPDOWN: Interface cable-modem0, changed state to up
00:14:26: 866.200 CMAC_LOG_DS_64QAM_LOCK_ACQUIRED 213000000
00:14:26: 866.204 CMAC_LOG_DS_CHANNEL_SCAN_COMPLETED
00:14:26: 866.206 CMAC_LOG_STATE_CHANGE wait_ucd_state
00:14:26: %LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to
down
00:14:27: 867.456 CMAC_LOG_UCD_MSG_RCVD 1
00:14:29: 869.470 CMAC_LOG_UCD_MSG_RCVD 1
00:14:29: 869.472 CMAC_LOG_ALL_UCDS_FOUND
00:14:29: 869.476 CMAC_LOG_STATE_CHANGE wait_map_state
00:14:29: 869.480 CMAC_LOG_UCD_NEW_US_FREQUENCY 20000000
00:14:29: 869.484 CMAC_LOG_SLOT_SIZE_CHANGED 8
```

## ■ show controllers cable-modem mac

```

00:14:29: 869.564 CMAC_LOG_FOUND_US_CHANNEL 1
00:14:31: 871.484 CMAC_LOG_UCD_MSG_RCVD 1
00:14:31: 871.692 CMAC_LOG_MAP_MSG_RCVD
00:14:31: 871.694 CMAC_LOG_INITIAL_RANGING_MINISLOTS 40
00:14:31: 871.696 CMAC_LOG_STATE_CHANGE ranging_1_state
00:14:31: 871.700 CMAC_LOG_RANGING_OFFSET_SET_TO 9610
00:14:31: 871.704 CMAC_LOG_POWER_LEVEL_IS 32.0 dBmV (commanded)
00:14:31: 871.708 CMAC_LOG_STARTING_RANGING
00:14:31: 871.710 CMAC_LOG_RANGING_BACKOFF_SET 0
00:14:31: 871.714 CMAC_LOG_RNG_REQ_QUEUED 0
00:14:32: 872.208 CMAC_LOG_RNG_REQ_TRANSMITTED
00:14:32: 872.216 CMAC_LOG_RNG_RSP_MSG_RCVD
00:14:32: 872.218 CMAC_LOG_RNG_RSP_SID_ASSIGNED 16
00:14:32: 872.222 CMAC_LOG_ADJUST_RANGING_OFFSET 2853
00:14:32: 872.224 CMAC_LOG_RANGING_OFFSET_SET_TO 12463
00:14:32: 872.228 CMAC_LOG_ADJUST_TX_POWER 8
00:14:32: 872.230 CMAC_LOG_POWER_LEVEL_IS 34.0 dBmV (commanded)
00:14:32: 872.234 CMAC_LOG_STATE_CHANGE ranging_2_state
00:14:32: 872.238 CMAC_LOG_RNG_REQ_QUEUED 16
00:14:32: 872.848 CMAC_LOG_RNG_REQ_TRANSMITTED
00:14:32: 872.852 CMAC_LOG_RNG_RSP_MSG_RCVD
00:14:32: 872.856 CMAC_LOG_RANGING_SUCCESS
00:14:32: 872.874 CMAC_LOG_STATE_CHANGE dhcp_state
00:14:33: 873.386 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS 188.188.1.62
00:14:33: 873.388 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS 4.0.0.32
00:14:33: 873.392 CMAC_LOG_DHCP_TOD_SERVER_ADDRESS 4.0.0.32
00:14:33: 873.396 CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS
00:14:33: 873.398 CMAC_LOG_DHCP_TZ_OFFSET 60
00:14:33: 873.402 CMAC_LOG_DHCP_CONFIG_FILE_NAME platinum.cm
00:14:33: 873.406 CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR
00:14:33: 873.410 CMAC_LOG_DHCP_COMPLETE
00:14:33: 873.536 CMAC_LOG_STATE_CHANGE establish_tod_state
00:14:33: 873.546 CMAC_LOG_TOD_REQUEST_SENT
00:14:33: 873.572 CMAC_LOG_TOD_REPLY_RECEIVED 3140961992
00:14:33: 873.578 CMAC_LOG_TOD_COMPLETE
00:14:33: 873.582 CMAC_LOG_STATE_CHANGE
security_association_state
00:14:33: 873.584 CMAC_LOG_SECURITY_BYPASSED
00:14:33: 873.588 CMAC_LOG_STATE_CHANGE configuration_file_state
00:14:33: 873.592 CMAC_LOG_LOADING_CONFIG_FILE platinum.cm
00:14:34: %LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to
up
00:14:34: 874.728 CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE
00:14:34: 874.730 CMAC_LOG_STATE_CHANGE registration_state
00:14:34: 874.734 CMAC_LOG_REG_REQ_MSG_QUEUED
00:14:34: 874.744 CMAC_LOG_REG_REQ_TRANSMITTED
00:14:34: 874.754 CMAC_LOG_REG_RSP_MSG_RCVD
00:14:34: 874.756 CMAC_LOG_COS_ASSIGNED_SID 1/16
00:14:34: 874.760 CMAC_LOG_RNG_REQ_QUEUED 16
00:14:34: 874.768 CMAC_LOG_REGISTRATION_OK
00
:14:34: 874.770 CMAC_LOG_REG_RSP_ACK_MSG_QUEUED 0
00:14:34: 874.774 CMAC_LOG_STATE_CHANGE establish_privacy_state
00:14:34: 874.778 CMAC_LOG_PRIVACY_NOT_CONFIGURED
00:14:34: 874.780 CMAC_LOG_STATE_CHANGE maintenance_state
00:14:34: 874.784 CMAC_LOG_REG_RSP_ACK_MESSAGE_EVENT
00:14:34: 874.788 CMAC_LOG_REG_RSP_ACK_MSG_SENT

```

The following example gives the typical error messages that appear in the MAC log when the DHCP server cannot not be reached:

Router# **show controllers cable-modem 0 mac log**

```

00:14:32: 872.874 CMAC_LOG_STATE_CHANGE dhcp_state

```

```

00:14:33: 873.386 CMAC_LOG_RNG_REQ_TRANSMITTED
00:14:33: 873.388 CMAC_LOG_RNG_RSP_MSG_RCVD
00:14:33: 873.386 CMAC_LOG_RNG_REQ_TRANSMITTED
00:14:33: 873.392 CMAC_LOG_RNG_RSP_MSG_RCVD
00:14:33: 873.396 CMAC_LOG_WATCHDOG_TIMER
00:14:33: 873.398 CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED
00:14:33: 873.402 CMAC_LOG_STATE_CHANGE reset_interface_state
00:14:33: 873.406 CMAC_LOG_DHCP_PROCESS_KILLED

```

Router#

In this situation, use the MAC error display also contains information indicating that the DHCP server could not be reached:

Router# **show controllers cable-modem 0 mac errors**

```

497989.804 D01.0 Discover sent no Offer received. No available DHCP Server.
498024.046 D01.0 Discover sent no Offer received. No available DHCP Server.
498058.284 D01.0 Discover sent no Offer received. No available DHCP Server.
Router#

```

The following is a typical display of the MAC error log information, which is the same information that is also available using SNMP:

Router# **show controllers cable-modem 0 mac errors**

```

74373.574 R02.0 No Ranging Response received. T3 time-out.
74374.660 R02.0 No Ranging Response received. T3 time-out.
74375.508 R02.0 No Ranging Response received. T3 time-out.
74375.748 R02.0 No Ranging Response received. T3 time-out.
74375.748 R03.0 Ranging Request Retries exhausted.
74376.112 R02.0 No Ranging Response received. T3 time-out.
74376.354 R02.0 No Ranging Response received. T3 time-out.
74376.778 R02.0 No Ranging Response received. T3 time-out.
74377.442 R02.0 No Ranging Response received. T3 time-out.
Router#

```

This output indicates that the router acquired a downstream lock, successfully read a UCD, and successfully read a MAP. However, it was unable to communicate with the CMTS after ranging through all upstream transmit power levels. The router will try to communicate with the CMTS 16 times, and if cannot receive a response from the CMTS, it will reset the cable interface to try to find a better downstream frequency.

The **show controllers cable-modem 0 mac resets** command shows only the entries in the MAC log that begin with the field `CMAC_LOG_RESET`. These fields provide you with a summary of the most recent reasons why the cable interface was reset.

Reset messages and brief explanations are included in the following examples. However, the reset messages do not commonly occur.

The following example shows the errors that are logged when the configuration file downloaded from the TFTP server could not be read, typically because the file might not exist, or because the file might have incorrect permissions.

Router# **show controllers cable-modem 0 mac resets**

```

62526.114 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
62564.368 CMAC_LOG_RESET_T4_EXPIRED
62677.178 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
62717.462 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
62757.746 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
62796.000 CMAC_LOG_RESET_T4_EXPIRED
62908.808 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED

```

## show controllers cable-modem mac

```
62949.092 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
62989.380 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
63029.662 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
63069.944 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
63110.228 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
63148.484 CMAC_LOG_RESET_T4_EXPIRED
63261.296 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
Router#
```

The following example shows that the DHCP server could not be reached, or that it took too long to respond.

```
Router# show controllers cable-modem 0 mac resets

497989.804 CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED
498024.046 CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED
498058.284 CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED
Router#
```

The following example indicates that an event in the cable interface driver caused the interface to reset. This often occurs because a **shutdown** command was just issued on the interface.

```
Router# show controllers cable-modem 0 mac resets

527986.444 CMAC_LOG_RESET_FROM_DRIVER
528302.042 CMAC_LOG_RESET_FROM_DRIVER
528346.600 CMAC_LOG_RESET_FROM_DRIVER
528444.494 CMAC_LOG_RESET_FROM_DRIVER
Router#
```

[Table 185](#) describes the status messages that can appear in the **show controllers cable-modem mac resets** command.

**Table 185** *show controllers cable-modem mac resets Field Descriptions*

| Message                                     | Description                                                                                                                                                                                     |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CMAC_LOG_RESET_CONFIG_FILE_PARSE_FAILED     | The format of the DOCSIS configuration file acquired from the TFTP server is not acceptable.                                                                                                    |
| CMAC_LOG_RESET_LOSS_OF_SYNC                 | Synchronization with the CMTS has been lost (SYNC messages are not being received).                                                                                                             |
| CMAC_LOG_RESET_T4_EXPIRED                   | The maintenance ranging opportunities for this router are not being received from the CMTS.                                                                                                     |
| CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED        | The DHCP server took too long to respond.                                                                                                                                                       |
| CMAC_LOG_RESET_TOD_WATCHDOG_EXPIRED         | The Time-of-Day (ToD) server took too long to respond.                                                                                                                                          |
| CMAC_LOG_RESET_PRIVACY_WATCHDOG_EXPIRED     | The baseline privacy exchange with the CMTS took too long.                                                                                                                                      |
| CMAC_LOG_RESET_CHANGE_US_WATCHDOG_EXPIRED   | The router was unable to transmit a response to a UCC-REQ message.                                                                                                                              |
| CMAC_LOG_RESET_SECURITY_WATCHDOG_EXPIRED    | A “full security” exchange with the CMTS took too long.                                                                                                                                         |
| CMAC_LOG_RESET_CONFIG_FILE_WATCHDOG_EXPIRED | The TFTP server took too long to respond.                                                                                                                                                       |
| CMAC_LOG_RESET_ALL_FREQUENCIES_SEARCHED     | All downstream frequencies to be searched have been searched.<br><b>Note</b> This message indicates that downstream frequencies were found, but the router failed to acquire a downstream lock. |
| CMAC_LOG_RESET_T2_EXPIRED                   | Initial ranging opportunities are not being received.                                                                                                                                           |

**Table 185** *show controllers cable-modem mac resets Field Descriptions (continued)*

| Message                                    | Description                                                                                                                                                                                                           |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CMAC_LOG_RESET_T3_RETRIES_EXHAUSTED        | The CMTS failed too many times to respond to a RNG-REQ message.<br><b>Note</b> After 16 T3 timeouts, the router will reset the cable interface.                                                                       |
| CMAC_LOG_RESET_RANGING_ABORTED             | The CMTS commanded the router to abort the ranging process.                                                                                                                                                           |
| CMAC_LOG_RESET_NO_MEMORY                   | The router has run out of memory.                                                                                                                                                                                     |
| CMAC_LOG_RESET_CANT_START_PROCESS          | The router was unable to start an internal process necessary to complete ranging and registration.                                                                                                                    |
| CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED     | The reading of the configuration file from the TFTP server failed.<br><b>Note</b> The file might not exist, or it might have incorrect permissions.                                                                   |
| CMAC_LOG_RESET_AUTHENTICATION_FAILURE      | The router failed authentication as indicated in a REG-RSP message from the CMTS.                                                                                                                                     |
| CMAC_LOG_RESET_SERVICE_NOT_AVAILABLE       | The CMTS has failed the router's registration because a required or requested class of service is not available.                                                                                                      |
| CMAC_LOG_RESET_T6_RETRIES_EXHAUSTED        | The CMTS failed too many times to respond to a REG-REQ message.                                                                                                                                                       |
| CMAC_LOG_RESET_MAINTENANCE_WATCHDOG_DRIVER | The router MAC layer failed to detect a change in the interface driver.                                                                                                                                               |
| CMAC_LOG_RESET_NET_ACCESS_MISSING          | The Network Access parameter is missing from the DOCSIS configuration file.                                                                                                                                           |
| CMAC_LOG_RESET_FAILED_WRITE_ACCESS_CONTROL | The router was unable to set the Write Access Control for an SNMP parameter as specified by the DOCSIS configuration file.                                                                                            |
| CMAC_LOG_RESET_DHCP_FAILED                 | The DHCP server did not respond with all the required values. The required values are: IP address, network mask, TFTP server IP address, TOD server IP address, DOCSIS configuration file name, and time zone offset. |
| CMAC_LOG_RESET_CANT_START_DS_TUNER_PROCESS | The router was unable to start the internal process used to manage the downstream tuner.                                                                                                                              |
| CMAC_LOG_RESET_TOO_MANY_DS_LOCKS_LOST      | Downstream QAM/FEC lock has been lost too many times.                                                                                                                                                                 |
| CMAC_LOG_RESET_NO_SEND_TO_DS_TUNER_PROCESS | The router MAC-layer process was unable to communicate with the downstream tuner management process.                                                                                                                  |
| CMAC_LOG_RESET_DS_TUNER_WATCHDOG           | The downstream tuner process failed to report its continuing operation for a long period of time.                                                                                                                     |
| CMAC_LOG_RESET_UNABLE_TO_SET_MIB_OBJECT    | The router was unable to set an SNMP parameter as specified by the DOCSIS configuration file.                                                                                                                         |
| CMAC_LOG_RESET_MIB_OBJECT_PROCESS_WATCHDOG | The internal MIB object took too long to process the entries in the DOCSIS configuration file.                                                                                                                        |

# show controllers cable-modem mac

The following example is a typical display for the **show controllers cable-modem 0 mac hardware** command. The most interesting bit is the station address (hardware address). The MIB statistics reflect the MAC hardware counters for various events, but these counters are typically reset every few seconds, so their contents are not accurate in this display.

```
Router# show controllers cable-modem 0 mac hardware
```

```
PLD VERSION: 32
```

```
BCM3300 unit 0, idb 0x200EB4, ds 0x82D4748, regaddr = 0x800000, reset_mask
0x80
```

```
station address 0010.7b43.aa01 default station address 0010.7b43.aa01
```

```
MAC mcfilter 01E02F00 data mcfilter 01000000
```

```
buffer size 1600
```

```
RX data PDU ring with 32 entries at 0x201D40
```

```
rx_head = 0x201D40 (0), rx_p = 0x82D4760 (0)
```

```
00 pak=0x82DF844 buf=0x227F1A status=0x80 pak_size=0
01 pak=0x82E0BF4 buf=0x22C56A status=0x80 pak_size=0
02 pak=0x82DF454 buf=0x22710A status=0x80 pak_size=0
03 pak=0x82DF64C buf=0x227812 status=0x80 pak_size=0
04 pak=0x82E0024 buf=0x229B3A status=0x80 pak_size=0
05 pak=0x82DBF2C buf=0x21B332 status=0x80 pak_size=0
06 pak=0x82DFE2C buf=0x229432 status=0x80 pak_size=0
07 pak=0x82E0FE4 buf=0x22D37A status=0x80 pak_size=0
08 pak=0x82DF064 buf=0x2262FA status=0x80 pak_size=0
09 pak=0x82DEC74 buf=0x2254EA status=0x80 pak_size=0
10 pak=0x82DEA7C buf=0x224DE2 status=0x80 pak_size=0
11 pak=0x82DE884 buf=0x2246DA status=0x80 pak_size=0
12 pak=0x82DE68C buf=0x223FD2 status=0x80 pak_size=0
13 pak=0x82DE494 buf=0x2238CA status=0x80 pak_size=0
14 pak=0x82DE29C buf=0x2231C2 status=0x80 pak_size=0
15 pak=0x82DE0A4 buf=0x222ABA status=0x80 pak_size=0
16 pak=0x82DDEAC buf=0x2223B2 status=0x80 pak_size=0
17 pak=0x82DDCB4 buf=0x221CAA status=0x80 pak_size=0
18 pak=0x82DDABC buf=0x2215A2 status=0x80 pak_size=0
19 pak=0x82DD8C4 buf=0x220E9A status=0x80 pak_size=0
20 pak=0x82DD6CC buf=0x220792 status=0x80 pak_size=0
21 pak=0x82DD4D4 buf=0x22008A status=0x80 pak_size=0
22 pak=0x82DD2DC buf=0x21F982 status=0x80 pak_size=0
23 pak=0x82DD0E4 buf=0x21F27A status=0x80 pak_size=0
24 pak=0x82DCEEC buf=0x21EB72 status=0x80 pak_size=0
25 pak=0x82DCCF4 buf=0x21E46A status=0x80 pak_size=0
26 pak=0x82DCAFC buf=0x21DD62 status=0x80 pak_size=0
27 pak=0x82DC904 buf=0x21D65A status=0x80 pak_size=0
28 pak=0x82DC70C buf=0x21CF52 status=0x80 pak_size=0
29 pak=0x82DC514 buf=0x21C84A status=0x80 pak_size=0
30 pak=0x82DC31C buf=0x21C142 status=0x80 pak_size=0
31 pak=0x82DC124 buf=0x21BA3A status=0xA0 pak_size=0
```

```
RX MAC message ring with 8 entries at 0x201E80
```

```
rx_head_mac = 0x201EB0 (6), rx_p_mac = 0x82D480C (6)
```

```
00 pak=0x82E0DEC buf=0x22CC72 status=0x80 pak_size=0
01 pak=0x82E021C buf=0x22A242 status=0x80 pak_size=0
02 pak=0x82E060C buf=0x22B052 status=0x80 pak_size=0
03 pak=0x82E11DC buf=0x22DA82 status=0x80 pak_size=0
04 pak=0x82DFC34 buf=0x228D2A status=0x80 pak_size=0
05 pak=0x82E09FC buf=0x22BE62 status=0x80 pak_size=0
06 pak=0x82DEE6C buf=0x225BF2 status=0x80 pak_size=0
07 pak=0x82DFA3C buf=0x228622 status=0xA0 pak_size=0
```

```
TX BD ring with 8 entries at 0x201FB8, tx_count = 0
```

```
tx_head = 0x201FB8 (0), head_txp = 0x82D4888 (0)
```

```
tx_tail = 0x201FB8 (0), tail_txp = 0x82D4888 (0)
```

```
00 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
```

```

01 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
02 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
03 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
04 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
05 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
06 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
07 pak=0x000000 buf=0x200000 status=0x20 pak_size=0
TX PD ring with 8 entries at 0x202038, tx_count = 0
tx_head_pd = 0x202038 (0)
tx_tail_pd = 0x202038 (0)
00 status=0x00 bd_index=0x0000 len=0x0000 hdr_len=0x0000
ehdr: 00 00 00 2E FF FF
01 status=0x00 bd_index=0x0001 len=0x0000 hdr_len=0x0000
ehdr: 00 00 00 2E FF FF
02 status=0x00 bd_index=0x0002 len=0x0000 hdr_len=0x0000
ehdr: 00 00 00 2E FF FF
03 status=0x00 bd_index=0x0003 len=0x0000 hdr_len=0x0000
ehdr: 00 00 00 2E FF FF
04 status=0x00 bd_index=0x0004 len=0x0000 hdr_len=0x0000
ehdr: 00 00 00 2E 00 00
05 status=0x00 bd_index=0x0005 len=0x0000 hdr_len=0x0000
ehdr: 00 00 00 2E 00 00
06 status=0x00 bd_index=0x0006 len=0x0000 hdr_len=0x0000
ehdr: 00 00 00 00 00 00
07 status=0x20 bd_index=0x0007 len=0x0000 hdr_len=0x0000
ehdr: 00 00 00 00 00 00

MIB Statistics
DS fifo full = 0, Rerequests = 0
DS mac msg overruns = 0, DS data overruns = 0
Qualified maps = 0, Qualified syncs = 0
CRC fails = 0, HDR chk fails = 0
Data pdus = 0, Mac msgs = 0
Valid hdrs = 0
BCM3300 Registers:
downstream dma:
ds_data_bd_base=0x001D40, ds_mac_bd_base=0x001E80
ds_data_dma_ctrl=0x98, ds_mac_dma_ctrl=0x98
ds_dma_data_index=0x0000, ds_dma_msg_index=0x0000
upstream dma:
us_bd_base=0x001FB8, us_pd_base=0x002038
us_dma_ctrl=0x00, us_dma_tx_start=0x00
global control and status:
global_ctrl_status=0x00
interrupts:
irq_pend=0x0018, irq_mask=0x00E7
timing recovery circuit:
loop_enable=0x00, minislot_divisor=0x00
K0_ctrl=0x06, K1_ctrl=0x07, acq_threshold=0x01
err_threshold=0x04, timeout_threshold=0xFF
nco_bias=0x4F7004F7, ranging_offset=0x00000000
ts_err=0x00, sync_valid=0x00, delta_F=0x00
timeout_err=0x00
spi:
dynamic_ctrl=0x09, static_ctr=0x9F, autonomous=0x01
irq_ack=0x00, spi_cmd=0x51, spi_addr=0x11
spi_data= FF/00/00/00/00/00
burst profiles:
profile 0:
01 19 1D 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
profile 1:

```

```
show controllers cable-modem mac
```

```

01 19 1D 03 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
profile 2:
01 19 1D 04 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
profile 3:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

```

Router#

Table 186 describes the MIB statistics shown in the display for this command.

**Table 186** MIB Statistics Field Descriptions

| Field               | Description                                                                                                                                                                                                                                                                                                        |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DS fifo full        | Number of times the downstream receive buffer on the router has become full.                                                                                                                                                                                                                                       |
| Rerequests          | Number of registration requests sent by the router to the CMTS.                                                                                                                                                                                                                                                    |
| DS mac msg overruns | Number of times the DMA controller has had a downstream MAC message and there were no free MAC message buffer descriptors to accept the message.                                                                                                                                                                   |
| DS data overruns    | Number of times the DMA controller has had downstream data and there were no free data PDU buffer descriptors to accept the data.                                                                                                                                                                                  |
| Qualified maps      | Number of valid MAP messages received by the router.                                                                                                                                                                                                                                                               |
| Qualified syncs     | Number of times the router has received synchronization with the downstream channel.                                                                                                                                                                                                                               |
| CRC fails           | Number of cyclic redundancy checks (CRCs) generated by the far-end device that did not match the checksums calculated from the message portions of the packets received.                                                                                                                                           |
| HDR check fails     | Number of cyclic redundancy checks (CRCs) generated by the far-end device that did not match the checksums calculated from the MAC headers of the packets received. The MAC header CRC is a 16-bit Header Check Sequence (HCS) field that ensures the integrity of the MAC header even in a collision environment. |
| Data pdus           | Total number of data PDUs (protocol data units) of all types received by the cable interface.                                                                                                                                                                                                                      |
| Mac msgs            | Number of MAC messages received by the cable interface.                                                                                                                                                                                                                                                            |
| Valid hdrs          | Number of valid MAC headers received by the cable interface.                                                                                                                                                                                                                                                       |

Below the MIB statistics in the **show controllers cable-modem 0 mac hardware** display, the BCM3300 registers section shows the DMA locations of the indicated processing routines of the Broadcom 3220 MAC chip within the router.



The following is typical output from the **show controllers cable-modem mac state** command that summarizes the state of the cable MAC layer and provides a list of downstream search frequency bands and the order in which they are searched. The normal operational state of the interface is the `maintenance_state`. If the cable MAC layer is in the `wait_for_link_up_state`, the information shown in the display corresponds to the last time the interface was up.

Router# **show controller cable-modem 0 mac state**

```

MAC State: maintenance_state
Ranging SID: 5
Registered: TRUE
Privacy Established: TRUE
Privacy Version: BPI+ (PLUS)
DOCSIS Operating Mode: DOCSIS 1.1

Snmp Operating Mode: Co-existence Mode

MIB Values:
 Mac Resets: 0
 Sync lost: 0
 Invalid Maps: 0
 Invalid UCDs: 0
 Invalid Rng Rsp: 0
 Invalid Reg Rsp: 0
 T1 Timeouts: 0
 T2 Timeouts: 0
 T3 Timeouts: 4
 T4 Timeouts: 0
 Range Aborts: 0

DS ID: 1
DS Frequency: 663000000
DS Symbol Rate: 5056941
DS QAM Mode 64QAM
DS Search:
 88 453000000 855000000 6000000
 89 930000000 105000000 6000000
 90 111250000 117250000 6000000
 91 231012500 327012500 6000000
 92 333015000 333015000 6000000
 93 339012500 399012500 6000000
 94 405000000 447000000 6000000
 95 123015000 129015000 6000000
 96 135012500 135012500 6000000
 97 141000000 171000000 6000000
 98 219000000 225000000 6000000
 99 177000000 213000000 6000000

US ID: 1
US Frequency: 20000000
US Power Level: 34.0 (dBmV)
US Symbol Rate: 1280000
Ranging Offset: 12460
Mini-Slot Size: 8
Change Count: 4
Preamble Pattern: CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC 0D 0D
 A9 17 D9 C3 52 2F B3 86 A4 5F 67 0D 48 BE CE 1A A9
 91 7D 9C 35 22 FB 38 6A 45 F6 70 D4 8B EC E1 A9
 17 D9 C3 52 2F B3 86 A4 5F 67 0D 48 BE CE 1A 91
 F3 F3 F3 F3 F3 F3 F3 F3 F3 F3 F3 F3 F3 F3 F3 F3
 F3 F3 F3 F3 F3 F3 F3 F3 F3 F3 F3 33 F7 33 F7
 88 84 04 4C C4 84 C0 0C 44 08 08 CC 8C 0C 80 48
 88 40 44 CC 48 4C 00 C4 40 80 8C C8 C0 C8 04 88

Burst Descriptor 0:

```

Cisco IOS CMTS Cable Command Reference

```

Auth. Reject Wait Time: 60
COS 1:
 Assigned SID: 5
 Max Downstream Rate: 4000000
 Max Upstream Rate: 2000000
 Upstream Priority: 7
 Min Upstream Rate: 100000
 Max Upstream Burst: 12
 Privacy Enable: TRUE
Ranging Backoff Start: 0 (at initial ranging)
Ranging Backoff End: 4 (at initial ranging)
Data Backoff Start: 0 (at initial ranging)
Data Backoff End: 4 (at initial ranging)
IP Address: 0.0.0.0
Net Mask: 0.0.0.0

TFTP Server IP Address: 223.255.254.254
Time Server IP Address: 188.188.1.5
Config File Name: muck/ebuell/tftp/cm_conf
Time Zone Offset: -28800
Log Server IP Address: 0.0.0.0

Drop Ack Enabled: TRUE
Piggyback when Ccat On: Disabled

Mac Sid Status
Max Sids: 4 Sids In Use: 1
 SFid Sid State Type rxtx Parm State IdB

 5 2 2 2 F4 7 811C24B0

Router#

```

Table 187 describes the fields shown in the display.

**Table 187** *show controller cable-modem mac state Field Descriptions*

| Field                 | Description                                                                                                                                                                  |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC State             | Current operational state of the MAC layer of the router.                                                                                                                    |
| Ranging SID           | Service ID used for ranging requests.                                                                                                                                        |
| Registered            | Indicates whether or not the router is currently registered with the CMTS.                                                                                                   |
| Privacy Established   | Indicates whether or not keys for baseline privacy have been exchanged between the router and the CMTS, establishing privacy.                                                |
| Privacy Version       | Indicates whether the router is using BPI or BPI+ baseline privacy.                                                                                                          |
| DOCSIS Operating Mode | Indicates the DOCSIS revision that the router has been provisioned for (DOCSIS 1.0 or DOCSIS 1.1).                                                                           |
| Snmp Operating Mode   | Indicates the current SNMP operating mode: <ul style="list-style-type: none"> <li>Co-existence Mode—SNMPv3 co-existence model</li> <li>NmAccess Mode—SNMPv2 model</li> </ul> |
| Mac Resets            | Number of times the router reset or initialized this interface.                                                                                                              |
| Sync lost             | Number of times the router lost synchronization with the downstream channel.                                                                                                 |
| Invalid Maps          | Number of times the router received invalid MAP messages.                                                                                                                    |

**Table 187** *show controller cable-modem mac state Field Descriptions (continued)*

| Field           | Description                                                                                                                                                                                                                                                                                                               |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Invalid UCDs    | Number of times the router received invalid upstream channel descriptor (UCD) messages.                                                                                                                                                                                                                                   |
| Invalid Rng Rsp | Number of times the router received invalid ranging response messages.                                                                                                                                                                                                                                                    |
| Invalid Reg Rsp | Number of times the router received invalid registration response messages.                                                                                                                                                                                                                                               |
| T1 Timeouts     | Number of timeouts caused by the router not receiving a valid UCD from the CMTS within the specified time.                                                                                                                                                                                                                |
| T2 Timeouts     | Number of timeouts caused by the router not receiving a maintenance broadcast for ranging opportunities from the CMTS within a specified time.                                                                                                                                                                            |
| T3 Timeouts     | Number of timeouts caused by the router not receiving a response within a specified time from the CMTS to a RNG-REQ message during initial maintenance.                                                                                                                                                                   |
| T4 Timeouts     | Number of timeouts caused by the router not receiving a response within a specified time from the CMTS to a periodic maintenance request.                                                                                                                                                                                 |
| Range Aborts    | Number of times the ranging process was aborted by the CMTS.                                                                                                                                                                                                                                                              |
| DS ID           | Identifier of the downstream channel on which this MAC management message has been transmitted. This identifier is arbitrarily chosen by the CMTS and is only unique within the MAC-sublayer domain.                                                                                                                      |
| DS Frequency    | Downstream frequency acquired by the router during its last initialization sequence.                                                                                                                                                                                                                                      |
| DS Symbol Rate  | Downstream frequency in symbols per second.                                                                                                                                                                                                                                                                               |
| DS QAM Mode     | Downstream modulation scheme being used by the router.                                                                                                                                                                                                                                                                    |
| DS Search       | Frequency bands scanned by the router when searching for a downstream channel. The router's default frequency bands correspond to the North American EIA CATV channel plan for 6 MHz channel slots between 90 MHz and 858 MHz.                                                                                            |
| US ID           | Identifier of the upstream channel to which this MAC management message refers. This identifier is arbitrarily chosen by the CMTS and is only unique within the MAC-sublayer domain.                                                                                                                                      |
| US Frequency    | Transmission frequency used by the router in the upstream direction.                                                                                                                                                                                                                                                      |
| US Power Level  | Transmit power level of the router in the upstream direction.                                                                                                                                                                                                                                                             |
| US Symbol Rate  | Upstream frequency in symbols per second.                                                                                                                                                                                                                                                                                 |
| Ranging Offset  | Delay correction (in increments of 6.25 microseconds/64) applied by the router to the CMTS upstream frame time derived at the router. Used to synchronize the upstream transmissions in the time division multiple access (TDMA) scheme, this value is roughly equal to the round-trip delay of the router from the CMTS. |
| Mini-Slot Size  | Size T of the mini-slot for this upstream channel in units of the timebase tick of 6.25 microseconds. Allowable values are 2, 4, 8, 16, 32, 64, or 128.                                                                                                                                                                   |

**Table 187** *show controller cable-modem mac state Field Descriptions (continued)*

| Field                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Change Count            | Incremented by 1 by the CMTS whenever any of the values of this channel descriptor change. If the value of this count in a subsequent upstream channel descriptor (UCD) remains the same, the router can quickly decide that the remaining fields have not changed, and may be able to disregard the remainder of the message.                                                                                                                                                                                                                                                                                              |
| Preamble Pattern        | Byte pattern used for the preamble.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Burst Descriptor:       | A compound type/length/value (TLV) encoding that defines, for each type of upstream usage interval, the physical-layer characteristics that are to be used during that interval. Each burst descriptor is given an identifying number.                                                                                                                                                                                                                                                                                                                                                                                      |
| Interval Usage Code     | Each upstream transmit burst belongs to a class which is given a number called the interval usage code (IUC). Bandwidth MAP messages are used by IUC codes to allocate upstream time slots. The following types are currently defined: <ol style="list-style-type: none"> <li>1. Request: bandwidth request slot</li> <li>2. Request/Data: bandwidth request or data slot</li> <li>3. Initial Maintenance: initial link registration contention slot</li> <li>4. Station Maintenance: link keep-alive slot</li> <li>5. Short Data Grant: short data burst slot</li> <li>6. Long Data Grant: long data burst slot</li> </ol> |
| Modulation Type         | Upstream modulation format. (1 = QPSK; 2 = 16-QAM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Differential Encoding   | Indicates whether or not differential encoding is used. (1 = yes; 2 = no)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Preamble Length         | Length of the preamble in bits. This value must be an integral number of symbols—a multiple of 2 for QPSK; a multiple of 4 for 16-QAM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| FEC Error Correction    | Length of the forward error correction in bytes. The range is 0 to 10 bytes; a value of 0 implies no forward error correction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| FEC Codeword Info Bytes | Number of information bytes in the FEC codeword.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Scrambler Seed          | 15-bit seed value loaded at the beginning of each burst after the register has been cleared. Not used if scrambler is off.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Maximum Burst Size      | Maximum number of mini-slots that can be transmitted during this burst type. When the interval type is Short Data Grant, this value must be greater than 0. If this value is 0, the burst size is limited elsewhere.                                                                                                                                                                                                                                                                                                                                                                                                        |
| Guard Time Size         | Amount of time in symbols between the center of the last symbol of a burst and the center of the first symbol of the preamble of an immediately following burst in an upstream transmission from the router to the CMTS.                                                                                                                                                                                                                                                                                                                                                                                                    |
| Last Codeword Length    | Indicates whether or not the length of the last codeword is fixed or shortened. (1 = fixed; 2 = shortened)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Scrambler on/off        | Indicates whether or not a scrambler is enabled in the upstream modulator. (1 = on; 2 = off)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Network Access          | Indicates whether or not the router has access to the HFC network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table 187** *show controller cable-modem mac state Field Descriptions (continued)*

| Field                  | Description                                                                                                                                                                                                                                              |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Concatenation          | Indicates whether DOCSIS 1.1 concatenation is enabled or disabled.                                                                                                                                                                                       |
| Maximum CPEs           | Maximum number of CPEs supported for this cable modem.                                                                                                                                                                                                   |
| Vendor ID              | Unique identifier specifying the CM manufacturer.                                                                                                                                                                                                        |
| Auth. Wait Timeout     | Number of seconds the router waits for a reply after sending the Authorization Request message to the CMTS.                                                                                                                                              |
| Reauth. Wait Timeout   | Number of seconds the router waits for a reply after it has sent an Authorization Request message to the CMTS in response to a reauthorization request or an Authorization Invalid message from the CMTS.                                                |
| Auth. Grace Time       | Number of seconds before the current authorization is set to expire that the grace timer begins, signaling the router to begin the reauthorization process.                                                                                              |
| Op. Wait Timeout       | Number of seconds the TEK state machine waits for a reply from the CMTS after sending its initial Key Request for its SID's keying material.                                                                                                             |
| Retry Wait Timeout     | Number of seconds the TEK state machine waits for a replacement key for this SID after the TEK grace timer has expired and the request for a replacement key has been made.                                                                              |
| TEK Grace Time         | Number of seconds before the current TEK is set to expire that the TEK grace timer begins, signaling the TEK state machine to request a replacement key.                                                                                                 |
| Auth. Reject Wait Time | Number of seconds the router waits before sending another Authorization Request message to the CMTS after it has received an Authorization Reject message.                                                                                               |
| Assigned SID           | Service ID assigned by the CMTS for the corresponding service class.                                                                                                                                                                                     |
| Max Downstream Rate    | Maximum downstream rate in bits per second that the CMTS is permitted to forward to CPE unicast MAC addresses learned or configured as mapping to this router. This rate does not include MAC packets addressed to broadcast or multicast MAC addresses. |
| Max Upstream Rate      | Maximum upstream rate in bits per second that the router is permitted to forward to the RF network. This rate includes packet PDU data packets addressed to broadcast or multicast addresses.                                                            |
| Upstream Priority      | Relative priority assigned to this service class for data transmission in the upstream channel. Higher numbers indicate higher priority.                                                                                                                 |
| Min Upstream Rate      | Rate in bits per second that will be guaranteed to this service class on the upstream channel.                                                                                                                                                           |
| Max Upstream Burst     | Maximum transmit burst in bytes allowed for this service class on the upstream channel.                                                                                                                                                                  |
| Privacy Enable         | Indicates whether or not Baseline Privacy is enabled for this service class.                                                                                                                                                                             |
| Ranging Backoff Start  | Initial back-off window for initial ranging contention, expressed as a power of 2. Valid values are from 0 to 15.                                                                                                                                        |
| Ranging Backoff End    | Final back-off window for initial ranging contention, expressed as a power of 2. Valid values are from 0 to 15.                                                                                                                                          |

**Table 187** *show controller cable-modem mac state Field Descriptions (continued)*

| Field                  | Description                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Data Backoff Start     | Initial back-off window for contention data and requests, expressed as a power of 2. Valid values are from 0 to 15.       |
| Data Backoff End       | Final back-off window for contention data and requests, expressed as a power of 2. Valid values are from 0 to 15.         |
| IP Address             | IP address of the cable interface.                                                                                        |
| Net Mask               | Subnet mask of the cable interface.                                                                                       |
| TFTP Server IP Address | IP address of the CMTS TFTP server.                                                                                       |
| Time Server IP Address | IP address of the CMTS Time-of-Day (TOD) server.                                                                          |
| Config File Name       | Name of the configuration file that is downloaded from the TFTP server to provide the router with operational parameters. |
| Time Zone Offset       | Correction received from the DHCP server to synchronize the router time clock with the CMTS.                              |
| Log Server IP Address  | Displays the IP address for a syslog server, if any has been defined.                                                     |
| Drop Ack Enabled       | Indicates whether the TCP drop acknowledge feature is enabled or disabled.                                                |
| Piggyback when Ccat On | Indicates whether the piggybacking of data onto request packets is enabled when concatenation is also enabled.            |
| Mac Sid Status         | Displays the service IDs currently in use.                                                                                |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                          | Description                                                                                                       |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem</b>              | Displays high-level controller information about the cable interface.                                             |
| <b>show controllers cable-modem bpkm</b>         | Displays information about the baseline privacy key management exchange between the cable interface and the CMTS. |
| <b>show controllers cable-modem crypto des</b>   | Displays information about the Data Encryption Standard (DES) engine registers.                                   |
| <b>show controllers cable-modem filters</b>      | Displays the registers in the MAC hardware that are used for filtering received frames.                           |
| <b>show controllers cable-modem lookup-table</b> | Displays the mini-slot lookup table for the cable interface.                                                      |
| <b>show controllers cable-modem phy</b>          | Displays the contents of the registers used in the downstream physical hardware for the cable interface.          |
| <b>show controllers cable-modem tuner</b>        | Displays the settings for the upstream and downstream tuners used by the cable interface.                         |

# show controllers cable-modem manuf-cert

To display the manufacturer’s X.509 certificate for the router, use the **show controllers cable-modem manuf-cert** command in privileged EXEC mode.

Cisco uBR905 and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter

**show controllers cable-modem** *number* **manuf-cert**

|                    |               |                                            |
|--------------------|---------------|--------------------------------------------|
| Syntax Description | <i>number</i> | Identifies the cable interface (always 0). |
|--------------------|---------------|--------------------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |            |                                                                                                                                  |
|-----------------|------------|----------------------------------------------------------------------------------------------------------------------------------|
| Command History | Release    | Modification                                                                                                                     |
|                 | 12.2(15)CZ | This command was introduced on the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

|                  |                                                                                                                                                                                                                                                                                                                                                               |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command displays the manufacturing certificate for Cisco Systems, which the Secure Software Download procedure uses to authenticate the software that the router downloads. This command shows the individual X.509 components of the certificate, starting with the DOCSIS restricted X.501 Distinguished Name and ending with the 1024-bit public key. |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Tip

This command displays the certificate that is incorporated into the Cisco IOS image that the router is currently running. Upgrading the Cisco IOS image could also update the manufacturer’s certificate. The **show controllers cable-modem cmcert** command displays the cable-modem certificate that is that is burned into the router at the factory and is not normally changed.

|          |                                                                                                                                                   |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows the starting lines and ending lines of typical output for the <b>show controllers cable-modem manuf-cert</b> command: |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show controllers cable-modem 0 manuf-cert

Cisco Manufacturing Certificate:
SEQ(819)
 SEQ(539)
 Context-specific [A0] (3)
 INT(1):2
 END
 INT(16): 0B F5 94 FD 7B 4E E0 79 90 83 5C A9 A4 BE A0 3E
1w3d: SEQ(13)
 OID(9):SHA Signature 1.2.840.113549.1.1.5
1w3d: NULL
 END
 SEQ(151)
 SET(11)
 SEQ(9)
```



```

 OID(3):Country 2.5.4.6
1w3d: PRT(2):US
 END
 END
 SET(57)
 SEQ(55)
 OID(3):Organization 2.5.4.10
1w3d: PRT(48):Data Over Cable Service Interface Specification
 END
 END
 SET(21)
 SEQ(19)
 OID(3):Organization Unit 2.5.4.11
1w3d: PRT(12):Cable Modems
 END
 END

...

1w3d: E1 13 05 10 3C F1 F1 A0 CE 43 74 30 9C 59 F5 70
1w3d: 4B C2 71 8E 79 AC 19 3D AB 94 1E B0 BE BC 15 D8
1w3d: AD A4 79 F5 58 CA 04 25 62 A9 F8 3F E7 40 64 E2
1w3d: 65 B0 D0 53 65 FF F1 12 FF 1B CD DE 1D 47 A2 6E
1w3d: END

```

Router#



#### Note

You must manually enter a return to redisplay the router prompt after the certificate has been displayed.

#### Related Commands

| Command                             | Description                                         |
|-------------------------------------|-----------------------------------------------------|
| <b>show controllers cable-modem</b> | Displays the router's public key X.509 certificate. |
| <b>cmcert</b>                       |                                                     |

# show controllers cable-modem phs

To display the payload header suppression (PHS) configuration on the router’s cable interface, use the **show controllers cable-modem phs** command in privileged EXEC mode.

Cisco uBR905, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

**show controllers cable-modem** *number* **phs** [*rule-index*]

|                    |                   |                                                                                             |
|--------------------|-------------------|---------------------------------------------------------------------------------------------|
| Syntax Description | <i>number</i>     | Identifies the cable interface (always 0).                                                  |
|                    | <i>rule-index</i> | (Optional) Displays information for a specific PHS rule index. The valid range is 1 to 255. |

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |            |                                                                                                                                   |
|-----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Command History | Release    | Modification                                                                                                                      |
|                 | 12.2(15)CZ | This command was introduced for the Cisco uBR905 and Cisco uBR924 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

|                  |                                                                                                                                                                                                                                 |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command displays the PHS parameters that are currently in use for both the upstream and downstream. The information shown corresponds to the PHS parameters that are listed in Appendix C of the DOCSIS 1.1 specification. |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                              |
|----------|--------------------------------------------------------------------------------------------------------------|
| Examples | The following shows an excerpt from typical output from the <b>show controllers cable-modem phs</b> command: |
|----------|--------------------------------------------------------------------------------------------------------------|

```
Router# show controllers cable-modem 0 phs

Upstream PHS Parameters

PHS Parameters
 PHS Classifier Refer: 2
 PHS Classifier ID: 1
 PHS Service Flow Reference: 1
 PHS Service Flow ID: 3
 PHS Dynsrv Change Action: 0
 PHS Fields:
 PHS Index: 1
 PHS Mask: 0x00 0x00 0x00 0x03 0xC0
 PHS Size: 0
 PHS Verification: 0

Upstream PHS Parameters

PHS Parameters
 PHS Classifier Refer: 2
 PHS Classifier ID: 1
 PHS Service Flow Reference: 1
```

```

PHS Service Flow ID: 3
PHS Dynsrv Change Action: 0
PHS Fields:
PHS Index: 1
PHS Mask: 0x00 0x00 0x00 0x03 0xC0
PHS Size: 0
PHS Verification: 0

Upstream PHS Parameters

PHS Parameters
PHS Classifier Refer: 2
PHS Classifier ID: 1
PHS Service Flow Reference: 1
PHS Service Flow ID: 3
PHS Dynsrv Change Action: 0
PHS Fields:
PHS Index: 1
PHS Mask: 0x00 0x00 0x00 0x03 0xC0
PHS Size: 0
PHS Verification: 0

...

Downstream PHS Parameters

PHS Parameters
PHS Classifier Refer: 1
PHS Classifier ID: 2
PHS Service Flow Reference: 2
PHS Service Flow ID: 4
PHS Dynsrv Change Action: 0
PHS Fields: 0x08 0x00 0x45 0x00 0x00 0x56 0x00 0x00 0x00 0x00 0x3B
0x00 0x6D 0xA7 0x01 0x0A 0x28 0x03 0x00 0x00 0x00 0x00
PHS Index: 1
PHS Mask: 0x00 0x03 0xC0
PHS Size: 22
PHS Verification: 0

Downstream PHS Parameters

PHS Parameters
PHS Classifier Refer: 3
PHS Classifier ID: 3
PHS Service Flow Reference: 4
PHS Service Flow ID: 10
PHS Dynsrv Change Action: 0
PHS Fields: 0x08 0x00 0x45 0x00 0x00 0x56 0x00 0x00 0x00 0x00 0x3B
0x00 0x6D 0xA7 0x00 0x00 0x00 0x00 0x01 0x0A 0x28 0x42
PHS Index: 2
PHS Mask: 0x00 0x00 0x3C
PHS Size: 0
PHS Verification: 0

```

Router#

The following shows a typical display for a specific PHS rule:

```
Router# show controllers cable-modem 0 phs 3
```

Downstream PHS Parameters

```
PHS Parameters
PHS Classifier Refer: 15
```

# show controllers cable-modem phs

```

PHS Classifier ID: 6
PHS Service Flow Reference: 6
PHS Service Flow ID: 1915
PHS Dynsrv Change Action: 0
PHS Fields: 0x08 0x00 0x45 0x00 0x00 0x56 0x00 0x00 0x00 0x00 0x3B
0x00 0x6D 0xA7 0x08 0x00 0x00 0x01 0x0C 0x00 0x00 0x01 0xAB 0xAB 0xAB 0xAB 0xAB 0xAB
0xAB 0xAB 0xAB 0xAB
PHS Index: 3
PHS Mask: 0xF0 0x00 0x01 0xFF 0xAB
PHS Size: 34
PHS Verification: 0

```

Router#

Table 0-188 describes the fields shown in the display.

**Table 0-188 show controllers cable-modem phs Field Descriptions**

| Field                       | Description                                                                                                                                                                                                                                                                                              |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PHS Classifier Refer        | The reference ID for the classifier using this PHS rule.                                                                                                                                                                                                                                                 |
| PHS Classifier ID           | The ID for the classifier using this PHS rule.                                                                                                                                                                                                                                                           |
| PHS Service Flow Reference  | The reference ID for the service flow using this PHS rule.                                                                                                                                                                                                                                               |
| PHS Service Flow ID         | The ID for the service flow using this PHS rule.                                                                                                                                                                                                                                                         |
| PHS Dynsrv Change Action    | The action taken in a dynamic service change request for this PHS rule: <ul style="list-style-type: none"> <li>0 = Add the PHS rule.</li> <li>1 = Set the PHS rule.</li> <li>2 = Delete the PHS rule.</li> <li>3 = Delete all PHS rules.</li> </ul>                                                      |
| PHS Fields                  | The bytes of the headers that must be suppressed and restored during PHS operation. For the upstream, this includes the PDU bytes starting with the first byte after the MAC header checksum. For the downstream, this includes the PDU bytes starting with the 13th byte after the MAC header checksum. |
| PHS Index                   | The index that references the suppressed byte string in the PHS Fields. The index is unique per service flow in the upstream direction and unique per the cable modem in the downstream direction.                                                                                                       |
| PHS Mask                    | The mask used to interpret the bytes in the PHS Fields, where each bit indicates whether the corresponding byte in the PHS Fields should be suppressed (0 = do not suppress, 1 = suppress).                                                                                                              |
| PHS Classifier Size         | The total number of bytes in the header to be suppressed.                                                                                                                                                                                                                                                |
| PHS Classifier Verification | Indicates whether the header bytes are to be verified before suppression (0 = verify, 1 = do not verify).                                                                                                                                                                                                |



## Tip

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                        | Description                                                                                                       |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem</b>            | Displays high-level controller information about the cable interface.                                             |
| <b>show controllers cable-modem bpkm</b>       | Displays information about the baseline privacy key management exchange between the cable interface and the CMTS. |
| <b>show controllers cable-modem crypto des</b> | Displays information about the Data Encryption Standard (DES) engine registers.                                   |
| <b>show controllers cable-modem filters</b>    | .Displays the registers in the MAC hardware that are used for filtering received frames.                          |
| <b>show controllers cable-modem mac</b>        | Displays detailed MAC-layer information for the cable interface.                                                  |
| <b>show controllers cable-modem phy</b>        | Displays the contents of the registers used in the downstream physical hardware of the cable interface.           |
| <b>show controllers cable-modem tuner</b>      | Displays the settings for the upstream and downstream tuners used by the cable interface.                         |

# show controllers cable-modem phy

To display the contents of the registers used in the downstream physical hardware of the router's cable interface, use the **show controllers cable-modem phy** command in privileged EXEC mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show controllers cable-modem** *number* **phy** {**receive** | **transmit**}

| Syntax Description |                                                                       |
|--------------------|-----------------------------------------------------------------------|
| <i>number</i>      | Identifies the cable interface (always <b>0</b> ).                    |
| <b>receive</b>     | Displays all receiver registers in the downstream physical hardware.  |
| <b>transmit</b>    | Displays all transmitter registers in the upstream physical hardware. |

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | Release    | Modification                                                          |
|-----------------|------------|-----------------------------------------------------------------------|
|                 | 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router. |
|                 | 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.           |
|                 | 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.           |
|                 | 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                 | 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.           |

| Usage Guidelines | To understand the output from this command, consult the Broadcom specifications for the BCM3116 and BCM3037 chips. |
|------------------|--------------------------------------------------------------------------------------------------------------------|
|------------------|--------------------------------------------------------------------------------------------------------------------|

| Examples | The following is typical output from the <b>show controllers cable-modem phy</b> command: |
|----------|-------------------------------------------------------------------------------------------|
|----------|-------------------------------------------------------------------------------------------|

```
Router# show controllers cable-modem 0 phy receive
```

```
BCM3116 Receiver Registers: Chip ID = C2C1
```

```
rstctl= frzctl=20 qamctl=1B lmsctl=0B tpctl=00 fmtctl=24
ffectl=3F irqsts=09 irqmask=00 stosc=9E rstctr=00 frzctl2=46
dvctl=30 idepth=55 eqlctl=00 tstctl=02 berctl=00 clkset=00
tunset=00 tunctl=03
```

```
FFC coefficient registers:
```

```
F0=0067FFBC F1=FF880080 F2=00C1FEFB F3=FF75019D
F4=00C5FD89 F5=FF6D0485 F6=FC95F690 F7=2D280000
```

```
DfE coefficient registers:
```

```
D00=0636031E D01=FBDD0314 D02=0077FD39 D03=001B00C6
D04=0024FF74 D05=0015007E D06=000CFFC4 D07=FFC0004B
D08=0044FFF6 D09=FFE00019 D10=00190005 D11=FFD3FFAD
D12=FFD3FFE0 D13=001A000A D14=FFF3FFED D15=0008FFFD
D16=FFFC0024 D17=0023FFDF D18=0029FFFF D19=000D001E
D20=00020017 D21=00250001 D22=0007FFF4 D23=FFF60014
```

```
ldsft=B0EE ldsnre=0098AF ldif=0D004E ldbbi=00000000
ldbbq=00000000 ldali=032E00 ldaii=E62AF2 ldbrho=705A05
ldbri=F9CDC200 lddrho=007E7D lddri=007EF0
```

```
FEC correctable error count: 0
FEC uncorrectable error count: 0
Bit Error Rate Count: 0
Router#
```

The following example shows typical output for the physical transmit registers:

Router# **show controllers cable-modem 0 phy transmit**

```
BCM3037 Transmitter Registers:
part_id = 3037 rev_id = 01
test_mode = 00 test_input = 00
test_misc = 2009 rst = 00
power = 0000 power_2 = 00
port = 6F pll = F7
map = 66 mod = 28
tx_oen_bdlx = 14 tx_oen_edly = C8
prbs_cfg = 00C000 baud = 1A36E3
burst = 0000 if_freq = 200000
dac = 37 tx_config = 00

burst config 0 : prbs_init = FFFFFFFF rs = 343E
 fec = 00 qam = 01
 pream_len = 0018 offset = 0000
burst config 1 : prbs_init = FFFFFFFE rs = 033B
 fec = 1C qam = 65
 pream_len = 0000 offset = 0000
burst config 2 : prbs_init = FFFFFFFE rs = 033B
 fec = 1D qam = 65
 pream_len = 0000 offset = 0000
burst config 3 : prbs_init = FFFFFFFE rs = 033B
 fec = 1E qam = 65
burst config 4 : prbs_init = FFFFFFFE rs = 033B
 fec = 1F qam = 65
 pream_len = 0000 offset = 0000
burst config 5 : prbs_init = FFFFFFFE rs = 033B
 fec = 0F qam = 66
 pream_len = 0000 offset = 0000

Eq Coeff:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Preamble values:
CC CC CC CC CC 0D 0D CC CC CC CC CC CC CC CC 0D
04 25 01 01 01 01 02 01 02 03 02 00 40 04 02 00
40 05 01 00 06 01 10 07 02 01 52 08 01 01 09 01
08 0A 01 01 0B 01 02 04 25 03 01 01 01 02 01 02
03 02 00 50 04 02 00 30 05 01 00 06 01 22 07 02
01 52 08 01 00 09 01 30 0A 01 01 0B 01 02 04 25
04 01 01 01 02 01 02 03 02 00 40 04 02 00 40 05
01 00 06 01 22 07 02 01 52 08 01 00 09 01 30 0A
```

Router#



#### Tip

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

| Related Commands | Command                                          | Description                                                                                                       |
|------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                  | <b>show controllers cable-modem</b>              | Displays high-level controller information about the cable interface.                                             |
|                  | <b>show controllers cable-modem bpk</b>          | Displays information about the baseline privacy key management exchange between the cable interface and the CMTS. |
|                  | <b>show controllers cable-modem crypto des</b>   | Displays information about the Data Encryption Standard (DES) engine registers.                                   |
|                  | <b>show controllers cable-modem filters</b>      | Displays the registers in the MAC hardware that are used for filtering received frames.                           |
|                  | <b>show controllers cable-modem lookup-table</b> | Displays the mini-slot lookup table inside the cable interface.                                                   |
|                  | <b>show controllers cable-modem mac</b>          | Displays detailed MAC-layer information for the cable interface.                                                  |
|                  | <b>show controllers cable-modem tuner</b>        | Displays the settings for the upstream and downstream tuners used by the cable interface.                         |



# show controllers cable-modem qos

To display detailed information about the Quality of Service (QoS) configuration for the router, use the **show controllers cable-modem qos** command in privileged EXEC mode.

**Cisco uBR905, Cisco uBR924, and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter**

**show controllers cable-modem** *number* **qos** [details]

## Syntax Description

|                |                                                                             |
|----------------|-----------------------------------------------------------------------------|
| <i>number</i>  | Identifies the cable interface (always <b>0</b> ).                          |
| <b>details</b> | (Optional) Displays detailed information, including classifier information. |

## Command Modes

Privileged EXEC

## Command History

| Release                | Modification                                                                                                                                                                                        |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(7)XR and 12.1(1)T | This command was introduced for the Cisco uBR924 cable access router.                                                                                                                               |
| 12.1(3)XL              | Support was added for the Cisco uBR905 cable access router.                                                                                                                                         |
| 12.1(5)XU1             | Support was added for the Cisco CVA122 Cable Voice Adapter.                                                                                                                                         |
| 12.2(2)XA              | Support was added for the Cisco uBR925 cable access router.                                                                                                                                         |
| 12.2(15)CZ             | Support for DOCSIS 1.1 and BPI+ operation was added for the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. The <b>details</b> option was also added. |

## Usage Guidelines

When the cable modem is operating in DOCSIS 1.0 or DOCSIS 1.0+ mode, this command displays the four possible stream queues, the Service ID (SID) associated with each queue (if the queue is currently in use), and whether the SID is the primary SID, a secondary (static) SID, or a dynamic (on demand) SID. The display also shows the packets and bytes that have been transmitted and received on each stream.

When the cable modem is operating in DOCSIS 1.1 mode, this command also displays the modem's capabilities and packet classifiers.

## Examples

The following example shows typical output for a DOCSIS 1.0 or DOCSIS 1.0+ cable modem for the QoS statistics for each of the router's four queues:

Router# **show controllers cable-modem 0 qos**

| Queue | SID | SID<br>Type | SFID | TX<br>Pkts | TX<br>Bytes | RX<br>Pkts | RX<br>Bytes |
|-------|-----|-------------|------|------------|-------------|------------|-------------|
| 0     | 2   | Primary     | 0    | 11377      | 2721985     | 12320      | 983969      |
| 1     | 52  | Dynamic     | 52   | 116        | 13608       | 105        | 14300       |
| 2     | 0   | NA          | 0    | 0          | 0           | 0          | 0           |
| 3     | 0   | NA          | 0    | 0          | 0           | 0          | 0           |

Router#

# show controllers cable-modem 0 qos

In Cisco IOS Release 12.2(15)CZ and later releases, the QoS statistics include information about the DOCSIS 1.1 operations, including the type of service flow and packet classifiers being used for each queue. The following is a typical default display:

Router# **show controllers cable-modem 0 qos**

| Queue | SID  | SF<br>Type | SF<br>Name | SFID | TX<br>Pkts | TX<br>Bytes | RX<br>Pkts | RX<br>Bytes |
|-------|------|------------|------------|------|------------|-------------|------------|-------------|
| 0     | 565  | Primary    | BE         | 675  | 200        | 34606       | 518        | 120321      |
| 1     | 1443 | Dynamic    | UGS        | 1911 | 0          | 0           | 0          | 0           |
| 2     | 1444 | Dynamic    | UGS_AD     | 1912 | 0          | 0           | 0          | 0           |
| 3     | 1445 | Dynamic    | RTP        | 1913 | 0          | 0           | 0          | 0           |

| Queue | Concat<br>packets | Capabilities<br>cbr cc fr nbr |
|-------|-------------------|-------------------------------|
|-------|-------------------|-------------------------------|

|   |   |         |
|---|---|---------|
| 0 | 2 | F T T F |
| 1 | 0 | T T T T |
| 2 | 0 | T T T T |
| 3 | 0 | F T T T |

Router#

The following shows a typical display with the **details** option:

Router# **show controllers cable-modem 0 qos details**

| Queue | SID  | SF<br>Type | SF<br>Name | SFID | TX<br>Pkts | TX<br>Bytes | RX<br>Pkts | RX<br>Bytes |
|-------|------|------------|------------|------|------------|-------------|------------|-------------|
| 0     | 565  | Primary    | BE         | 675  | 200        | 34606       | 529        | 123351      |
| 1     | 1443 | Dynamic    | UGS        | 1911 | 0          | 0           | 0          | 0           |
| 2     | 1444 | Dynamic    | UGS_AD     | 1912 | 0          | 0           | 0          | 0           |
| 3     | 1445 | Dynamic    | RTP        | 1913 | 0          | 0           | 0          | 0           |

| Queue | Concat<br>packets | Capabilities<br>cbr cc fr nbr |
|-------|-------------------|-------------------------------|
|-------|-------------------|-------------------------------|

|   |   |         |
|---|---|---------|
| 0 | 2 | F T T F |
| 1 | 0 | T T T T |
| 2 | 0 | T T T T |
| 3 | 0 | F T T T |

Packet Classifiers

| Class id | SFID | Pri | valid | Match | SIDT     |
|----------|------|-----|-------|-------|----------|
| 1        | 1913 | 0   | 14    | 0     | 811EDDE8 |
| 2        | 1912 | 0   | 14    | 0     | 811EDBB8 |
| 3        | 1911 | 0   | 14    | 0     | 811ED988 |
| 4        | 675  | 0   | 14    | 0     | 811ED758 |

PHS: Inactive

PHS: Active Index: 1 Size: 34 Suppressed Size: 13

SFID: 1912 Classifier Id: 2

Verify: TRUE Packets: 0 Bytes Suppressed: 0

PHS: Active Index: 1 Size: 34 Suppressed Size: 13

SFID: 1911 Classifier Id: 3

```

Verify: TRUE Packets: 0 Bytes Suppressed: 0
PHS: Active Index: 1 Size: 34 Suppressed Size: 13
SFID: 675 Classifier Id: 4
Verify: TRUE Packets: 0 Bytes Suppressed: 0

Downstream Payload Header Suppression
PHS: Active Index: 1 Size: 34 Suppressed Size: 14 (index = 1)
SFID: 676 Classifier Id: 8
Verify: TRUE Packets: 0 Bytes Suppressed: 0
PHS: Active Index: 2 Size: 34 Suppressed Size: 14 (index = 2)
SFID: 1914 Classifier Id: 7
Verify: TRUE Packets: 0 Bytes Suppressed: 0
PHS: Active Index: 3 Size: 34 Suppressed Size: 14 (index = 3)
SFID: 1915 Classifier Id: 6
Verify: TRUE Packets: 0 Bytes Suppressed: 0

Router#

```

Table 189 describes the significant fields shown in the display for a DOCSIS 1.0 or DOCSIS 1.0+ cable modem:

**Table 189** *show controllers cable-modem qos Field Descriptions*

| Field         | Description                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Queue         | One of the four possible service flow queues that exist in the router.                                                                                                                                                                                                                                                                                                                                                 |
| SID           | Service identifier, a 14-bit integer assigned by the CMTS to each active upstream service flow.                                                                                                                                                                                                                                                                                                                        |
| SID Type      | The type of SID: <ul style="list-style-type: none"> <li>Primary—The service flow used for best-effort data traffic and MAC maintenance messages.</li> <li>Secondary—Secondary static service flows that are created at power-on provisioning for voice calls when dynamic SIDs are not active.</li> <li>Dynamic—Secondary service flows that are created for on-demand voice calls when using dynamic SIDs.</li> </ul> |
| SFID          | Service flow identifier, a 32-bit integer assigned by the CMTS to each service flow on the router.                                                                                                                                                                                                                                                                                                                     |
| TX Pkts       | Number of packets the router has transmitted on this service flow.                                                                                                                                                                                                                                                                                                                                                     |
| TX Bytes      | Number of bytes the router has transmitted on this service flow.                                                                                                                                                                                                                                                                                                                                                       |
| RX Pkts       | Number of packets the router has received on this service flow.                                                                                                                                                                                                                                                                                                                                                        |
| RX Bytes      | Number of bytes the router has received on this service flow.                                                                                                                                                                                                                                                                                                                                                          |
| Queue/SF Type | Identifies the type of service flow being used for each queue.                                                                                                                                                                                                                                                                                                                                                         |

In Cisco IOS Release 12.2(15)CZ and later releases, the QoS statistics include information about the DOCSIS 1.1 operations, including the type of service flow and packet classifiers being used for each queue:

```
Router# show controllers cable-modem 0 qos
```

```

Queue SID SID SFID TX TX RX RX Capabilities
 Type Pkts Bytes Pkts Bytes cbr cc fr nbr

```

## ■ show controllers cable-modem qos

```

0 1 Primary 3 40 5740 2780 209346 F T T F
1 56 Dynamic 91 1782 160140 0 0 T T T T
2 58 Dynamic 93 690 61946 0 0 T T T T
3 0 NA 0 0 0 0 0 F F F F

```

```

Queue SF Type
0 BE
1 BE
2 UGS_AD
3 NA

```

## Packet Classifiers

```

Class id SFID Pri valid Match SIDT
 1 91 0 D6 1782 80D2754C
 2 93 0 D6 691 80D275C0

```

## Packet Classifier Details

```

Classifier id = 1 SFID = 91
IP source: 10.188.1.88
IP dest: 10.188.1.66
UDP/TCP source range: 18416 to 18416
UDP/TCP dest range: 16740 to 16740
IP Protocol: 17
PHS: Inactive

```

```

Classifier id = 2 SFID = 93
IP source: 10.188.1.88
IP dest: 10.188.1.66
UDP/TCP source range: 16796 to 16796
UDP/TCP dest range: 19138 to 19138
IP Protocol: 17
PHS: Inactive

```

## Downstream Payload Header Suppression

Table 190 describes the fields shown in the display for a DOCSIS 1.1 cable modem.

**Table 190** *show controllers cable-modem qos Field Descriptions (DOCSIS 1.1)*

| Field    | Description                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Queue    | One of the four possible service flow queues that exist in the router.                                                                                                                                                                                                                                                                                                                                                 |
| SID      | Service Identifier, a 14-bit integer assigned by the CMTS to each active upstream service flow.                                                                                                                                                                                                                                                                                                                        |
| SID Type | The type of SID: <ul style="list-style-type: none"> <li>Primary—The service flow used for best-effort data traffic and MAC maintenance messages.</li> <li>Secondary—Secondary static service flows that are created at power-on provisioning for voice calls when dynamic SIDs are not active.</li> <li>Dynamic—Secondary service flows that are created for on-demand voice calls when using dynamic SIDs.</li> </ul> |
| SFID     | Service Flow Identifier, a 32-bit integer assigned by the CMTS to each service flow on the router.                                                                                                                                                                                                                                                                                                                     |

**Table 190** *show controllers cable-modem qos Field Descriptions (DOCSIS 1.1) (continued)*

| Field              | Description                                                                                                                             |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| TX Pkts            | Number of packets the router has transmitted on this service flow.                                                                      |
| TX Bytes           | Number of bytes the router has transmitted on this service flow.                                                                        |
| RX Pkts            | Number of packets the router has received on this service flow.                                                                         |
| RX Bytes           | Number of bytes the router has received on this service flow.                                                                           |
| Capabilities       | These four fields describe whether the following features are enabled.                                                                  |
| cbr                | Indicates whether committed bit rate traffic (CBR) is supported (T) or not (F). This could indicate either UGS or UGS-AD service flows. |
| cc                 | Indicates whether concatenation is supported (T) or not (F).                                                                            |
| fr                 | Indicates whether DOCSIS fragmentation is supported (T) or not (F).                                                                     |
| nbr                | Indicates the Not Broadcast status, depending on whether the classifier supports broadcasts (F) or not (T).                             |
| Queue/SF Type      | Identifies the type of service flow being used for each queue.                                                                          |
| Packet Classifiers | Describes the classifiers defined on the router.                                                                                        |
| Class id           | ID used to uniquely identify the classifier in each service flow.                                                                       |
| SFID               | ID that uniquely identifies the service flow.                                                                                           |
| Pri                | Traffic Priority parameter that was assigned to this classifier. If no value was set, the priority defaults to 0 (lowest priority).     |

**Table 190** *show controllers cable-modem qos Field Descriptions (DOCSIS 1.1) (continued)*

| Field                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| valid                                 | <p>A 13-bit bitmask showing which Type/Length/Value (TLV) fields were set on the classifier. The following shows the meaning of each bit, with the least significant bit on the far right. The bit is set to 1 if the corresponding TLV was set for the classifier:</p> <ul style="list-style-type: none"> <li>• 0x0001—IP Type of Service Range and Mask</li> <li>• 0x0002—IP Protocol</li> <li>• 0x0004—IP Source Address</li> <li>• 0x0008—IP Source Mask</li> <li>• 0x0010—IP Destination Address</li> <li>• 0x0020—IP Destination Mask</li> <li>• 0x0040—TCP/UDP Source Port Start and TCP/UDP Source Port End</li> <li>• 0x0080—TCP/UDP Destination Port Start and TCP/UDP Destination Port End</li> <li>• 0x0100—Destination MAC Address</li> <li>• 0x0200—Source MAC Address</li> <li>• 0x0400—Ethertype/DSAP/MacType</li> <li>• 0x0800—IEEE 802.1P User_Priority</li> <li>• 0x1000—IEEE 802.1Q VLAN_ID</li> </ul> <p>For example, a value of D6 translates to the bit-mask “1101 0110”, which indicates that the following fields were set for the classifier: IP Protocol, IP Source Address, IP Destination Address, and the TCP/UDP Source and Destination Port values.</p> |
| Match                                 | Number of packets matching the classifier.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| SIDT                                  | Address for the classifier in the internal SID table (SIDT).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Packet Classifier Details             | Describes each packet classifier in detail.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Classifier ID                         | ID used to uniquely identify the classifier in each service flow.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| SFID                                  | ID that uniquely identifies the service flow.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| IP source                             | The matching IP source address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| IP dest                               | The matching IP destination address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| UDP/TCP source range                  | The low-end and high-end matching source TCP/UDP port values.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| UDP/TCP dest range                    | The low-end and high-end matching destination TCP/UDP port values.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| IP Protocol                           | The matching IP protocol type, as given in <a href="#">RFC 1700</a> . A value of 256 matches any IP protocol, and a value of 257 matches TCP and UDP traffic.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| PHS                                   | Indicates whether Payload Header Suppression (PHS) is active or inactive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Downstream Payload Header Suppression | Indicates that PHS is being used on the downstream.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                 | Description                                                               |
|-----------------------------------------|---------------------------------------------------------------------------|
| <b>show controllers cable-modem mac</b> | Displays detailed MAC-layer information for the router's cable interface. |

# show controllers cable-modem service-flows

To display the service flows that are configured on the router, use the **show controllers cable-modem service-flows** command in privileged EXEC mode.

Cisco uBR905, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

**show controllers cable-modem** *number* **service-flows** [*sfid* | **summary**]

|                    |                |                                                                                                                                                                        |
|--------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>number</i>  | Identifies the cable interface (always <b>0</b> ).                                                                                                                     |
|                    | <i>sfid</i>    | (Optional) Displays detailed information for a specific service flow, as identified by its service flow ID (SFID). The valid range for <i>sfid</i> is 1 to 2147483647. |
|                    | <b>summary</b> | (Optional) Displays a summary report of all service flows.                                                                                                             |

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |                |                                                                                                                                   |
|-----------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                                                                                               |
|                 | 12.2(15)CZ     | This command was introduced for the Cisco uBR905 and Cisco uBR924 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

|                  |                                                                                                                                                                                                                                                                                             |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command displays the Quality of Service (QoS) parameters that make up each of the service flows that are defined on the router for the upstream and downstream. The information shown corresponds to the QoS parameters that are listed in Appendix C of the DOCSIS 1.1 specification. |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                   |
|----------|-----------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows typical output for the default form of the <b>show controllers cable-modem service-flows</b> command. |
|----------|-----------------------------------------------------------------------------------------------------------------------------------|

Router# **show controllers cable-modem 0 service-flows**

```
Upstream Flow Scheduler Parameters
Flow Type: Primary
 Flow Reference: 1
 Service Flow ID: 3
 Service ID: 2
 QoS Set Type: 7
 QoS Traffic Priority: 0
 QoS Max Sustained Traffic Rate: 0
 QoS Max Traffic Burst: 1522
 QoS Min Reserved Traffic Rate: 0
 QoS Min Reserved Rate Pkt Size: 0
 QoS Timeout For Active Param: 0
 Qos Timeout For Admitted Param: 200
 Max Concatenated Burst: 0
 Scheduling Type: 0x2
 Request/Transmission Policy: 0x0
 Nominal Polling Interval: 0
 Tolerated Poll Jitter: 0
```



```

Unsolicited Grant Size: 0
Nominal Grant Interval: 0
Tolerated Grant Jitter: 0
Grants Per Interval: 0
IP TOS Overwrite: 0xFF 0x0

```

#### Downstream Flow Scheduler Parameters

##### Flow Type: Primary

```

Flow Reference: 5
Service Flow ID: 4
Service ID: 0
QoS Set Type: 7
QoS Traffic Priority: 0
QoS Max Sustained Traffic Rate: 0
QoS Max Traffic Burst: 1522
QoS Min Reserved Traffic Rate: 64000
QoS Min Reserved Rate Pkt Size: 0
QoS Timeout For Active Param: 0
Qos Timeout For Admitted Param: 200
Max DS Latency: 0

```

#### Downstream Flow Scheduler Parameters

##### Flow Type: Static

```

Flow Reference: 6
Service Flow ID: 5
Service ID: 0
QoS Set Type: 7
QoS Max Sustained Traffic Rate: 10000
QoS Max Traffic Burst: 1522
QoS Min Reserved Traffic Rate: 8000
QoS Min Reserved Rate Pkt Size: 0
QoS Timeout For Active Param: 0
Qos Timeout For Admitted Param: 200
Max DS Latency: 0

```

#### Downstream Flow Scheduler Parameters

##### Flow Type: Static

```

Flow Reference: 8
Service Flow ID: 7
Service ID: 0
QoS Set Type: 7
QoS Traffic Priority: 0
QoS Max Sustained Traffic Rate: 30000
QoS Max Traffic Burst: 1522
QoS Min Reserved Traffic Rate: 28000
QoS Min Reserved Rate Pkt Size: 0
QoS Timeout For Active Param: 0
Qos Timeout For Admitted Param: 200
Max DS Latency: 0

```

Router#

The following example shows typical output for the **summary** option of the **show controllers cable-modem service-flows** command.

Router# **show controllers cable-modem 0 service-flows summary**

| Sfid | Sid | Sf<br>type | Sf<br>Ref | Service<br>Class name | Direction  |
|------|-----|------------|-----------|-----------------------|------------|
| 13   | 6   | Primary    | 2         | -                     | upstream   |
| 14   | N/A | Primary    | 1         | -                     | downstream |

Router#

The following example shows typical output for the **show controllers cable-modem service-flows** command, when displaying information for individual service flows:

```
Router# show controllers cable-modem 0 service-flows 3
```

```
Upstream Flow Scheduler Parameters
Flow Type: Primary
 Flow Reference: 1
 Service Flow ID: 3
 Service ID: 2
 QoS Set Type: 7
 QoS Traffic Priority: 0
 QoS Max Sustained Traffic Rate: 0
 QoS Max Traffic Burst: 1522
 QoS Min Reserved Traffic Rate: 0
 QoS Min Reserved Rate Pkt Size: 0
 QoS Timeout For Active Param: 0
 Qos Timeout For Admitted Param: 200
 Max Concatenated Burst: 0
 Scheduling Type: 0x2
 Request/Transmission Policy: 0x0
 Nominal Polling Interval: 0
 Tolerated Poll Jitter: 0
 Unsolicited Grant Size: 0
 Nominal Grant Interval: 0
 Tolerated Grant Jitter: 0
 Grants Per Interval: 0
 IP TOS Overwrite: 0xFF 0x0
```

```
Router# show controllers cable-modem 0 service-flows 4
```

```
Downstream Flow Scheduler Parameters
Flow Type: Primary
 Flow Reference: 5
 Service Flow ID: 4
 Service ID: 0
 QoS Set Type: 7
 QoS Traffic Priority: 0
 QoS Max Sustained Traffic Rate: 0
 QoS Max Traffic Burst: 1522
 QoS Min Reserved Traffic Rate: 64000
 QoS Min Reserved Rate Pkt Size: 0
 QoS Timeout For Active Param: 0
 Qos Timeout For Admitted Param: 200
 Max DS Latency: 0
```

```
Router#
```

[Table 191](#) describes the significant fields shown by this command. The information shown corresponds to the QoS parameters that are listed in Appendix C of the DOCSIS 1.1 specification.

**Table 191** *show controllers cable-modem service-flows Field Descriptions*

| Field                  | Description                                                                                                                                                                                                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flow Type, Sf type     | Identifies whether the type of service-flow: <ul style="list-style-type: none"> <li>Primary—The primary service-flow for the upstream or downstream.</li> <li>Static—A permanent secondary service-flow.</li> <li>Dynamic—A dynamically created secondary service-flow.</li> </ul> |
| Flow Reference, Sf Ref | The service flow reference ID that is used to establish the Service Flow ID.                                                                                                                                                                                                       |

**Table 191** *show controllers cable-modem service-flows Field Descriptions*

| Field                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Service Flow ID, Sfid          | The ID that unique identifies this service flow on the upstream or downstream.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Service ID, Sid                | The service identifier (SID) that the CMTS assigns to the service flow.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| QoS Set Type                   | <p>The QoS parameter set type for the service flow. This is a three-bit value, where bit 0 is set for the Provisioned Set, bit 1 is set for the Admitted Set, and bit 2 is set for the Active Set. Multiple bits can be set to produce the following possible values:</p> <ul style="list-style-type: none"> <li>• 0 = Set Active and Admitted Sets to null.</li> <li>• 1 = Apply to Provisioned Set only.</li> <li>• 2 = Perform admission control and apply to Admitted Set only.</li> <li>• 3 = Perform admission control and apply to Provisioned and Admitted Sets.</li> <li>• 4 = Check against Admitted set in separate Service Flow encoding, perform admission control if needed, activate this service flow, and apply to Active Set.</li> <li>• 5 = Perform admission control, apply to Provisioned and Active Sets, and activate this service flow.</li> <li>• 6 = Perform admission control, activate this service flow, and apply to Admitted and Active Sets.</li> <li>• 7 = Perform admission control, activate this service flow, and apply to Provisioned, Admitted, and Active Sets.</li> </ul> |
| QoS Traffic Priority           | The priority assigned to the service flow (0 to 7, where 7 is the highest priority).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| QoS Max Sustained Traffic Rate | The maximum traffic rate, in bits, for a token-bucket rate limit for packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| QoS Max Traffic Burst          | The maximum size of a single packet on this service flow.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| QoS Min Reserved Traffic Rate  | The minimum rate, in bits per second, for traffic on this service flow.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| QoS Min Reserved Rate Pkt Size | The minimum packet size, in bytes, for which the minimum rate can be sustained on this service flow.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| QoS Timeout For Active Param   | The maximum time, in seconds, that resources on a service flow can remain unused before the CMTS sets the flow's Admitted and Active Sets to null. A value of 0 indicates no timeout period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Qos Timeout For Admitted Param | The maximum time, in seconds, that Admitted resources on a service flow can remain without being activated. After this timeout period, the CMTS will release Admitted resources on a service flow and retain only the activated ones.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Max Concatenated Burst         | The maximum burst size, in bytes, for concatenated traffic on the service flow. A value of 0 indicates no limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 191** *show controllers cable-modem service-flows Field Descriptions*

| Field                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scheduling Type             | <p>The type of service used on the upstream for grant requests:</p> <ul style="list-style-type: none"> <li>• 1 = Undefined</li> <li>• 2 = Best effort</li> <li>• 3 = Non-real-time polling service (NRTPS)</li> <li>• 4 = Real-time polling service (RTPS)</li> <li>• 5 = Unsolicited grant service with activity detection (UGS-AD)</li> <li>• 6 = Unsolicited grant service (UGS)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Request/Transmission Policy | <p>The allowable means of grant request and transmission on the upstream. This value is a 9-bit mask where the bits have the following meanings when set to 1:</p> <ul style="list-style-type: none"> <li>• Bit 0 = Do not use broadcast request opportunities.</li> <li>• Bit 1 = Do not use priority request multicast request opportunities.</li> <li>• Bit 2 = Do not use Request/Data grants for requests.</li> <li>• Bit 3 = Do not use Request/Data grants for data.</li> <li>• Bit 4 = Do not piggyback data on grant requests.</li> <li>• Bit 5 = Do not use concatenation.</li> <li>• Bit 6 = Do not use DOCSIS fragmentation.</li> <li>• Bit 7 = Do not use payload header suppression (PHS).</li> <li>• Bit 8 = UGS service flows must drop packets that do not fit.</li> </ul> <p>See <a href="#">Table 192</a> for the possible values of each bit for each of the supported flow types.</p> |
| Nominal Polling Interval    | The interval, in microseconds, between successive unicast grant requests for the service flow on the upstream.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Tolerated Poll Jitter       | The maximum amount of time, in microseconds, that a unicast request interval may be delayed from the typical polling schedule.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Unsolicited Grant Size      | The size of unsolicited grants, in bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Nominal Grant Interval      | The interval, in microseconds, between successive data grant opportunities for the service flow on the upstream.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Tolerated Grant Jitter      | The maximum amount of time, in microseconds, that transmission opportunities may be delayed from the typical polling schedule.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Grants Per Interval         | The actual number of grants per Nominal Grant Interval for UGS service flows, and the maximum number of active grants per Nominal Grant Interval for UGS-AD service flows.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Max DS Latency              | The maximum latency, in microseconds, between the reception of a packet by the CMTS on its network interface and the transmission of the packet on its downstream cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Table 192 Request/Transmission Policy Values

|                                                   | Drop if Not Fit In UGS Size | Do Not Use... |       |        |                    |                   |                       |                             |                    |
|---------------------------------------------------|-----------------------------|---------------|-------|--------|--------------------|-------------------|-----------------------|-----------------------------|--------------------|
|                                                   |                             |               |       |        | Piggyback Requests | Req/Data for Data | Req/Data for Requests | Priority Multicast Requests | Broadcast Requests |
|                                                   |                             | PHS           | Frag  | Concat |                    |                   |                       |                             |                    |
|                                                   | Bit 8                       | Bit 7         | Bit 6 | Bit 5  | Bit 4              | Bit 3             | Bit 2                 | Bit 1                       | Bit 0              |
| Best-Effort                                       | X                           | X             | X     | X      | X                  | X                 | X                     | X                           | X                  |
| Non-Real Time Polling                             | X                           | X             | X     | X      | X                  | X                 | X                     | 0 or 1                      | 0 or 1             |
| Real-Time Polling                                 | X                           | X             | X     | X      | 0 or 1             | 0 or 1            | 0 or 1                | 0 or 1                      | 0 or 1             |
| Unsolicited Grant Service                         | X                           | X             | X     | X      | 1                  | 1                 | 1                     | 1                           | 1                  |
| Unsolicited Grant Service with Activity Detection | X                           | X             | X     | X      | 1                  | 1                 | 1                     | 1                           | 1                  |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                        | Description                                                                                                       |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem</b>            | Displays high-level controller information about the cable interface.                                             |
| <b>show controllers cable-modem bpk</b>        | Displays information about the baseline privacy key management exchange between the cable interface and the CMTS. |
| <b>show controllers cable-modem crypto des</b> | Displays information about the Data Encryption Standard (DES) engine registers.                                   |
| <b>show controllers cable-modem filters</b>    | .Displays the registers in the MAC hardware that are used for filtering received frames.                          |
| <b>show controllers cable-modem mac</b>        | Displays detailed MAC-layer information for the cable interface.                                                  |
| <b>show controllers cable-modem phy</b>        | Displays the contents of the registers used in the downstream physical hardware of the cable interface.           |
| <b>show controllers cable-modem tuner</b>      | Displays the settings for the upstream and downstream tuners used by the cable interface.                         |

# show controllers cable-modem tuner

To display the settings for the upstream and downstream tuners used by a router, use the **show controllers cable-modem tuner** command in privileged EXEC mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show controllers cable-modem *number* tuner**

|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> Identifies the cable interface (always <b>0</b> ). |
|---------------------------|------------------------------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

|                        |                |                                                                       |
|------------------------|----------------|-----------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                   |
|                        | 11.3(4)NA      | This command was introduced for the Cisco uBR904 cable access router. |
|                        | 12.0(4)XI1     | Support was added for the Cisco uBR924 cable access router.           |
|                        | 12.1(3)XL      | Support was added for the Cisco uBR905 cable access router.           |
|                        | 12.1(5)XU1     | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                        | 12.2(2)XA      | Support was added for the Cisco uBR925 cable access router.           |

**Examples** The following example shows typical tuner settings. [Table 193](#) describes the output field possibilities and descriptions.

```
Router# show controllers cable-modem 0 tuner
```

```
Tuner: status=0x00
Rx: tuner_freq 507000000, symbol_rate 5360736, local_freq 11520000
 snr_estimate 17488, ber_estimate 0, lock_threshold 26000
 QAM not in lock, FEC not in lock, qam_mode QAM_64
Tx: tx_freq 20000000, power_level 0x3E, symbol_rate 1280000
Router#
```

**Table 193** *show controllers cable-modem tuner Field Descriptions*

| Field          | Description                                                                 |
|----------------|-----------------------------------------------------------------------------|
| tuner_freq     | Indicates the current downstream frequency.                                 |
| symbol_rate    | Indicates the downstream symbol rate in symbols per second.                 |
| local_freq     | Frequency on which the transmitter and tuner communicate.                   |
| snr_estimate   | Signal-to-noise ratio (SNR) estimate in dB multiplied by 1000.              |
| ber_estimate   | Bit error rate estimate (always 0).                                         |
| lock_threshold | Minimum SNR that the router will accept as a valid lock.                    |
| QAM status     | Indicates if QAM/FEC lock has been acquired and the modulation mode in use. |
| tx_freq        | Upstream frequency sent to the router by the CMTS in the UCD message.       |

**Table 193** *show controllers cable-modem tuner Field Descriptions (continued)*

| Field       | Description                                                                                                                                                                                                         |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| power_level | Transmit power level as set in the hardware, given as a hexadecimal value. The units are unique to the hardware used. Use the <b>show controllers cable-modem mac state</b> command to see the power level in dBmV. |
| symbol_rate | Indicates the upstream symbol rate in symbols per second that is negotiated between the CMTS and the cable access router.                                                                                           |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                          | Description                                                                                                       |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>show controllers cable-modem</b>              | Displays high-level controller information about the cable interface.                                             |
| <b>show controllers cable-modem bpk</b>          | Displays information about the baseline privacy key management exchange between the cable interface and the CMTS. |
| <b>show controllers cable-modem crypto des</b>   | Displays information about the Data Encryption Standard (DES) engine registers.                                   |
| <b>show controllers cable-modem filters</b>      | Displays the registers in the MAC hardware that are used for filtering received frames.                           |
| <b>show controllers cable-modem lookup-table</b> | Displays the mini-slot lookup table inside the cable interface.                                                   |
| <b>show controllers cable-modem mac</b>          | Displays detailed MAC-layer information for the cable interface.                                                  |
| <b>show controllers cable-modem phy</b>          | Displays the contents of the registers used in the downstream physical hardware of the cable interface.           |

# show controllers clock-reference

To display hardware information, register values, and current counters for the TCC+ card or the Cisco cable clock card, use the **show controllers clock-reference** command in privileged EXEC mode.

**show controllers clock-reference**

**Syntax Description**      This command has no keywords or arguments.

**Command Modes**          Privileged EXEC

| Command History | Release    | Modification                                                            |
|-----------------|------------|-------------------------------------------------------------------------|
|                 | 12.1(1a)T1 | This command was introduced.                                            |
|                 | 12.1(2)EC1 | This command was supported on the EC train.                             |
|                 | 12.2(2)XF  | This command was supported for the TCC+ card on Cisco uBR10012 routers. |
|                 | 12.2(4)BC1 | Support was added to the Release 12.2 BC train.                         |

**Usage Guidelines**      To reset the counters that are displayed with the **show controllers clock-reference** command, use the **cable clock clear-counters** command.

  
**Note**

This command is not applicable on the SC train.

This command supports the Cisco CMTS clock feature set, which provides a synchronized clock for improved Voice-over-IP (VoIP) operations. The clock feature set requires one of the following configurations:

- A Cisco uBR10012 router with one or two TCC+ cards that are connected to an external national clock source.
- A Cisco uBR7246 VXR router using a Cisco uBR-MC16S, Cisco uBR-MC16E, Cisco uBR-MC28C, or Cisco uBR-MC28C-BNC cable interface line card. The router must also be equipped with a Cisco cable clock card and be running Cisco IOS 12.1(1a)T1, 12.1(2)EC1, or a later release. The Cisco cable clock card should be connected to an external national clock source.

Only these cable interface cards support the external clock card reference from a clock card to distribute that signal to CMs or set-top boxes (STBs) attached to the specific network segments. You can use other cable interface cards, such as the Cisco uBR-MC16C, with the clock card, but these other cable interfaces will not synchronize their downstream SYNC messages with the external clock source.

Each CM or STB must also support VoIP applications and the clock feature set. For example, the Cisco uBR924, running Cisco IOS Release 12.0(7)T or later, supports clock card feature automatically.

**Examples**                  The following is sample output from the **show controllers clock-reference** command for a Cisco uBR7246 VXR router with a national clock card:



```
Router# show controllers clock-reference
```

```
National clock card with T1 controller
Control register :0x4
Status register :0x54
LIU Config Register 0:0x0
LIU Config Register 1:0x0
1 events reported in 266636 seconds
Primary active :1, LOS :0
Secondary active :0, LOS :1
Holdovers :0, HW faults :0
Router#
```

The following is sample output from the **show controllers clock-reference** command for a Cisco uBR10012 router with two TCC+ cards.


**Note**

Each TCC+ card—Active and Backup—has its own separate set of registers.

```
Router# show controllers clock-reference
```

```
Controllers for Card in Slot: 1
Interrupt Status Reg : 0x0
Interrupt Mask Reg : 0x0
UCPC Bus Control Status Reg : 0x4035
Push Button Status Reg : 0x0
Line Card Presence Status Reg : 0x21
TSRG Control Reg : 0xB800
LC Power off Control Reg : 0x0
PEMA Voltage Monitor High Time Reg : 0x0
PEMA Voltage Monitor Total Time Reg : 0x0
PEMA Current Monitor High Time Reg : 0x0
PEMA Current Monitor Total Time Reg : 0x0
PEMB Voltage Monitor High Time Reg : 0x66
PEMB Voltage Monitor Total Time Reg : 0xCD
PEMB Current Monitor High Time Reg : 0x1C
PEMB Current Monitor Total Time Reg : 0x34
LIU0 Read Write Reg : 0x11
LIU1 Read Write Reg : 0x11
LCD Control Reg RS0 : 0x39
LCD Control Reg RS1 : 0x39
General Purpose Control Reg 0 : 0x2
General Purpose Control Reg 1 : 0x2
General Purpose Control Reg 2 : 0x40
LC Power off Status Reg : 0x0
Sec Clock Control Reg : 0x81
Sec Clock Status Reg : 0x1
Push Button Input Reg : 0x0
LC Presence Input Reg : 0x21
```

```
Compare Errors rcvd from 1/1: 0
Parity Errors rcvd from 1/1 : 0
```

```
Controllers for Card in Slot: 2
Interrupt Status Reg : 0x0
Interrupt Mask Reg : 0x0
UCPC Bus Control Status Reg : 0x4053
Push Button Status Reg : 0x0
Line Card Presence Status Reg : 0x21
TSRG Control Reg : 0xB800
LC Power off Control Reg : 0x0
```

```

PEMA Voltage Monitor High Time Reg : 0x0
PEMA Voltage Monitor Total Time Reg : 0x0
PEMA Current Monitor High Time Reg : 0x0
PEMA Current Monitor Total Time Reg : 0x0
PEMB Voltage Monitor High Time Reg : 0x66
PEMB Voltage Monitor Total Time Reg : 0xCD
PEMB Current Monitor High Time Reg : 0x1C
PEMB Current Monitor Total Time Reg : 0x34
LIU0 Read Write Reg : 0x30
LIU1 Read Write Reg : 0x11
LCD Control Reg RS0 : 0x66
LCD Control Reg RS1 : 0x20
General Purpose Control Reg 0 : 0x0
General Purpose Control Reg 1 : 0x1
General Purpose Control Reg 2 : 0x43
LC Power off Status Reg : 0x0
Sec Clock Control Reg : 0x80
Sec Clock Status Reg : 0x1
Push Button Input Reg : 0x0
LC Presence Input Reg : 0x21

```

```
Compare Errors rcvd from 2/1: 0
```

```
Parity Errors rcvd from 2/1 : 0
```

```
PEM A Power = 0w, PEM B Power = 343w
```

```
Router#
```

**Note**

The **show controllers clock-reference** command might display compare errors on the Cisco uBR10012 router because there could be a slight delay at system startup before the TCC+ cards synchronize with each other. These initial compare errors can be ignored and cleared with the **cable clock clear-counters** command.

Most of the information shown by the **show controllers clock-reference** command is in the form of a hexadecimal bitfield that is not meaningful for normal operations, but the following fields can be useful in troubleshooting problems with the TCC+ and cable interface line cards:

- UCPC Bus Control Status Reg—Displays the status of both TCC+ cards and whether the LCD Display Panel is present.
- Line Card Presence Status Reg—Provides a software view of whether a cable interface line card is physically present in the Cisco uBR10012 chassis.
- LC Presence Input Reg—Provides a hardware view of whether a cable interface line card is physically present in the Cisco uBR10012 chassis.
- LC Power off Status Reg—Indicates whether a cable interface line card slot has been powered off using the **cable power** command.

Table 0-194 shows how to interpret these fields.

**Table 0-194** *show controllers clock-reference Field Descriptions*

| Field                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UCPC Bus Control Status Reg | <p>Displays the status of both TCC+ cards and of the LCD Display Panel. Each TCC+ card displays this field from its own point of view, where “this card” refers to itself and “the other card” refers to the other TCC+ card slot.</p> <ul style="list-style-type: none"> <li>Bits 2–0 display the status of the other TCC+ card: <ul style="list-style-type: none"> <li>0x00=No card.</li> <li>0x03=The other card is the backup card.</li> <li>0x05=The other card is the active card.</li> </ul> </li> <li>Bit 3 is set to 1 upon a state change for the other TCC+ card.</li> <li>Bits 6–4 display the status of this TCC+ card: <ul style="list-style-type: none"> <li>0x00=No card.</li> <li>0x03=This card is the backup card.</li> <li>0x05=This card is the active card.</li> <li>0x06=This card has assumed the active card role, because the other card had been active but is now unresponsive.</li> </ul> </li> <li>Bit 7 is set to 1 upon a state change for this TCC+ card.</li> <li>Bits 13–8 are unused.</li> <li>Bit 14 is set to 1 if the LCD Display Panel is present.</li> <li>Bit 15 is set to 1 if the presence of the LCD Display Panel has changed since the counters were last cleared.</li> </ul> |

The most common bit patterns for the UCPC Bus Control Status Reg field are:

- 0x4003—This TCC+ card is not present, the other card is the active card, and an LCD Display is present.
- 0x4030—This TCC+ card is the active card, the other card is not present, and an LCD Display is present.
- 0x4035—This TCC+ card is the backup card, the other card is the active card, and an LCD Display is present.
- 0x4053—This TCC+ card is the active card, the other card is the backup card, and an LCD Display is present.
- 0x4065—This TCC+ card has assumed the active card role, because the other card had been active but is now unresponsive. The LCD Display is present.

**Table 0-194** *show controllers clock-reference Field Descriptions (continued)*

| Field                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Line Card Presence Status Reg | <p>The first eight bits indicate whether the line card is physically present, and the high eight bits indicate whether the card's physical state has changed since the counters were last cleared using the <b>cable clock clear-counters</b> command.</p> <p>0x0001=slot 5/0 contains a cable interface card<br/> 0x0002=slot 5/1 contains a cable interface card<br/> 0x0004=slot 6/0 contains a cable interface card<br/> 0x0008=slot 6/1 contains a cable interface card<br/> 0x0010=slot 7/0 contains a cable interface card<br/> 0x0020=slot 7/1 contains a cable interface card<br/> 0x0040=slot 8/0 contains a cable interface card<br/> 0x0080=slot 8/1 contains a cable interface card</p> <p>0x0100=slot 5/0 has changed physical state<br/> 0x0200=slot 5/1 has changed physical state<br/> 0x0400=slot 6/0 has changed physical state<br/> 0x0800=slot 6/1 has changed physical state<br/> 0x1000=slot 7/0 has changed physical state<br/> 0x2000=slot 7/1 has changed physical state<br/> 0x4000=slot 8/0 has changed physical state<br/> 0x8000=slot 8/1 has changed physical state</p> |
| LC Presence Input Reg         | <p>The lower eight bits of this register indicate whether a cable interface line card is physically present in the chassis slot. The bit meanings are the same as the lower eight bits the Line Card Presence Status Reg.</p> <p>The upper eight bits of this register are unused.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>                   | The Line Card Presence Status Reg displays the line card state as determined by the Cisco IOS software, while the LC Presence Input Reg displays the state as determined by the chassis hardware.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| LC Power off Status Reg       | <p>0x01=slot 5/0 is powered off<br/> 0x02=slot 5/1 is powered off<br/> 0x04=slot 6/0 is powered off<br/> 0x08=slot 6/1 is powered off<br/> 0x10=slot 7/0 is powered off<br/> 0x20=slot 7/1 is powered off<br/> 0x40=slot 8/0 is powered off<br/> 0x80=slot 8/1 is powered off</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

| Related Commands | Command                           | Description                                                                                                                                                                                     |
|------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable clock clear-counters</b> | Clears the counters displayed with the <b>show controllers clock-reference</b> command.                                                                                                         |
|                  | <b>cable power</b>                | On the Cisco uBR10012 routers, turns a cable interface line card on or off, which updates the LC Power off Status registers displayed with the <b>show controllers clock-reference</b> command. |
|                  | <b>show cable clock</b>           | Displays the status of the Cisco cable clock card and the TCC+ card.                                                                                                                            |

# show controllers jacket

To display Wideband SIP register values, use the **show controllers jacket** command in privileged EXEC mode.

```
show controllers jacket slot/subslot [all | cpld | processor | vanadium | spi_fpga]
```

## Syntax Description

|                  |                                                                                                                        |
|------------------|------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>      | The slot where the Wideband SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for the Wideband SIP. |
| <i>subslot</i>   | The subslot where the Wideband SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.               |
| <b>all</b>       | (Optional) Displays values for all registers.                                                                          |
| <b>cpld</b>      | (Optional) Displays values for the CPLD registers.                                                                     |
| <b>processor</b> | (Optional) Displays values for the processor registers.                                                                |
| <b>vanadium</b>  | (Optional) Displays values for the Vanadium registers.                                                                 |
| <b>spi_fpga</b>  | (Optional) Displays values for the SPI FPGA registers.                                                                 |

## Command Default

If you do not specify **all** or the keyword for a specific register, **show controllers jacket** displays values for all registers.

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

## Usage Guidelines

- Use the **show controllers jacket** command to display Wideband SIP register values. Values for the following Wideband SIP components can be displayed:
- CPLD—A Complex Programmable Logic Device (CPLD) that contains logic to control resets, the I/O bus, and SPA OIR.
  - Processor—The Wideband SIP on-board processor that is responsible for configuring the chips on the SIP, communication to the PRE module, and communication with the SPA.
  - Vanadium—A Cisco-designed ASIC that provides a link between the Wideband SIP and the PRE module.
  - SPI FPGA—A bus converter that supports up to eight channels on a POS-PHY Level 3 (PL3) interface and up to eight channels shared between the two System Packet Interface Level 4 Phase 2 (SPI 4.2) interfaces. The SPI FPGA also interfaces the on-board processor complex to the Wideband SIP bus.

## Examples

The following examples display **show controllers jacket** command output for the **cpld** and **processor** keywords:

```
Router# show controllers jacket 1/0 cpld
```

CPLD registers

```
[A4000000] Version:4
[A4000004] Clock frequency:32
[A4000008] Reset status and control:1
[A400000C] Software reset reason:0
[A4000010] Datapath reset: 19
[A4000014] SPA 0 OIR register: FF
[A4000018] SPA 1 OIR register: FF
[A400001C] SPA OIR interrupt status: (would clear on read)
[A4000020] SPA OIR interrupt mask: FF
```

```
Router# show controllers jacket 1/0 processor
```

Processor Registers

```
Port A:
 Pin Assignment C00000
 Data Direction FF437C3A
 Open-Drain 1800F
 Data A88005
 Special Options 0000
Port B:
 Pin Assignment 0008
 Data Direction FFFFBEF
 Open-Drain 0000
 Data BF0FEFC
 Special Options 0008
Port C:
 Pin Assignment 3580C
 Data Direction FF7CA7F3
 Open-Drain 0000
 Data 84D004
 Special Options 0000
Port D:
 Pin Assignment 30005
 Data Direction FFCFFFE
 Open-Drain 30000
 Data 30000
 Special Options 30000
```

## Related Commands

| Command                               | Description                        |
|---------------------------------------|------------------------------------|
| <b>show controllers modular-cable</b> | Displays Wideband SPA information. |

# show controllers modular-cable

To display information about the Cisco uBR-MC3GX60V cable line card and Wideband SPA, use the **show controllers modular-cable** command in privileged EXEC mode.

```
show controllers modular-cable slot/subslot/bay {brief | fpga_registers |
all | sfp [port port_num] | ge_phy [port port_num]}}
```

**Cisco IOS Releases 12.3(23)BC5, 12.2(33)SCB and later releases**

```
show controllers modular-cable slot/bay/port | slot/subslot/controller {all | association |
bpi-entry bpi-index | brief | config | crashinfo | dsid-log search min max | dsid-ref-log dsid n
| errors | fpga_version | fpga_registers | ge_phy [port port_num] | ioofpga | mapping
[rf-channel | wb-channel] | registers | rf-channel channel_number | sfp [port port_num] |
spa-log-all | stat-index-log search min max | status | wideband-channel channel_number}
```



## Note

The options mentioned in the syntax above are indicative and may vary with the cable interface line card used in the Cisco uBR10012 universal broadband router.

## Syntax Description

|                                          |                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot/subslot/bay or slot/bay/port</i> | Wideband SPA slot, subslot, bay, and port. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the Wideband SIP resides. The valid values are 1 and 3.</li> <li><i>subslot</i>—Subslot where the Wideband SIP resides. The valid value is 0.</li> <li><i>bay</i>—Wideband SIP bay where the SPA resides. The valid range is from 0 to 3.</li> </ul>               |
| <i>slot/subslot/controller</i>           | Modular-cable line card slot, subslot, and controller. <ul style="list-style-type: none"> <li><i>slot</i>—Modular-cable line card slot. The valid value range is from 5 to 8.</li> <li><i>subslot</i>—Modular-cable line card subslot. The valid value is 0 or 1.</li> <li><i>controller</i>—Modular-cable line card controller. The valid range is from 0 to 2.</li> </ul> |
| <i>port</i>                              | Specifies the interface number on the SPA.                                                                                                                                                                                                                                                                                                                                  |
| <b>all</b>                               | (Optional) Displays all information about the modular-cable controller.                                                                                                                                                                                                                                                                                                     |
| <b>association</b>                       | Displays associations between the MAC domains and wideband interfaces.                                                                                                                                                                                                                                                                                                      |
| <b>bpi-entry</b> <i>bpi-index</i>        | Displays information about Baseline Privacy Interface (BPI). <ul style="list-style-type: none"> <li><i>bpi-index</i>—BPI index. The valid range is from 0 to 24575.</li> </ul>                                                                                                                                                                                              |
| <b>brief</b>                             | (Optional) Displays a brief summary of the controller information.                                                                                                                                                                                                                                                                                                          |
| <b>config</b>                            | Displays information about the configuration of the downstream field-programmable gate array (FPGA).                                                                                                                                                                                                                                                                        |
| <b>counters</b>                          | Displays information about channel counters.                                                                                                                                                                                                                                                                                                                                |
| <b>crashinfo</b>                         | Displays crash information for the Wideband SPA.                                                                                                                                                                                                                                                                                                                            |



|                                             |                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dsid-log search</b> <i>min max</i>       | Searches for downstream IDs (DSID) in the Wideband SPA logs. <ul style="list-style-type: none"> <li><i>min</i>—Minimum search value. The valid range is from 1 to 65535.</li> <li><i>max</i>—Maximum search value. The valid range is from 1 to 65535.</li> </ul> <b>Note</b> This keyword is used to collect data only when requested by Cisco TAC.                                                  |
| <b>dsid-ref-log</b> <i>dsid n</i>           | Retrieves last statistical index and ref count for DSID. <ul style="list-style-type: none"> <li><i>n</i>—DSID search value. The valid range is from 1 to 65535.</li> </ul> <b>Note</b> This keyword is used to collect data only when requested by Cisco TAC.                                                                                                                                         |
| <b>errors</b>                               | Displays errors.                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>fpga_registers</b>                       | (Optional) Displays information on the Wideband SPA Field-Programmable Gate Array (FPGA) (Blaze) registers.                                                                                                                                                                                                                                                                                           |
| <b>fpga_version</b>                         | Displays the FPGA version of the cable interface line cards.                                                                                                                                                                                                                                                                                                                                          |
| <b>ge_phy</b>                               | (Optional) Displays physical layer (PHY) information on the Gigabit Ethernet ports.                                                                                                                                                                                                                                                                                                                   |
| <b>iofpga</b>                               | Displays information about I/O FPGA.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>mapping</b>                              | Displays information about the mapping of the configured RF channel and wideband channels. <ul style="list-style-type: none"> <li><i>rf-channel</i>—RF channel counters. The valid range is from 0 to 31. If not specified all channels are displayed.</li> <li><i>wb-channel</i>—Wideband channel counters. The valid range is from 0 to 31. If not specified all channels are displayed.</li> </ul> |
| <b>registers</b>                            | Displays registers for the downstream FPGAs.                                                                                                                                                                                                                                                                                                                                                          |
| <b>rf-channel</b><br><i>channel-number</i>  | Displays information for the RF channel indicated by <i>channel-number</i> . <ul style="list-style-type: none"> <li><i>channel-number</i>—RF channel number. The valid values are from 0 to 23.</li> </ul>                                                                                                                                                                                            |
| <b>sfp</b>                                  | (Optional) Displays information about the small form-factor pluggable (SFP) modules.                                                                                                                                                                                                                                                                                                                  |
| <b>stat-index-log search</b> <i>min max</i> | Searches for downstream statistical indexes in SPA logs. <ul style="list-style-type: none"> <li><i>min</i>—Minimum search value. The valid range is from 1 to 65535.</li> <li><i>max</i>—Maximum search value. The valid range is from 1 to 65535.</li> </ul> <b>Note</b> This keyword is used to collect data only when requested by Cisco TAC.                                                      |
| <b>spa-log-all</b>                          | Displays SPA debug logs. <b>Note</b> This keyword is used to collect data only when requested by Cisco TAC.                                                                                                                                                                                                                                                                                           |
| <b>port</b> <i>port_num</i>                 | (Optional) When used with <b>sfp</b> or <b>ge_phy</b> keywords, the information displayed is for the specified Gigabit Ethernet port. If the <b>port</b> <i>port_num</i> argument is not used, the information displayed is for both Gigabit Ethernet ports.                                                                                                                                          |

|                                                  |                                                                                                                                                                                                                          |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>status</b>                                    | Displays status of the downstream FPGAs.                                                                                                                                                                                 |
| <b>wideband-channel</b><br><i>channel-number</i> | Displays information about the wideband channel indicated by <i>channel-number</i> . <ul style="list-style-type: none"> <li><i>channel-number</i>—Wideband channel number. The valid values are from 0 to 31.</li> </ul> |

**Command Default**

If you specify no keyword or argument, all categories of information for both Gigabit Ethernet ports are displayed.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                   |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                                                |
| 12.3(23)BC5 | The command output was modified.                                                                                                                                                                               |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |
| 12.3(23)BC6 | The command output was modified to capture the SPA environment monitoring information.                                                                                                                         |
| 12.2(33)SCC | The command output was modified to capture the toggle information.                                                                                                                                             |
| 12.2(33)SCE | This command was modified to include multiple keywords for the Cisco uBR-MC3GX60V cable line card.                                                                                                             |
| 12.2(33)SCG | This command was modified to include <b>dsid-log</b> , <b>dsid-ref-log</b> , <b>stat-index-log</b> , and <b>spa-log-all</b> keywords.                                                                          |
| 12.2(33)SCH | Support was added for the Bonding Across 3G60 Controllers Support feature added. The valid ranges for <i>rf-channel</i> and <i>wb-channel</i> counters for the <b>mapping</b> option are specified.            |

**Usage Guidelines**

If you specify **all** instead of **sfp** or **ge\_phy**, information for the SFP module and PHY is displayed.

**Note**

This command will not provide crash dump information for the Cisco 10000 series SIP-600. Use the **show diag 1/0 crashdump** command to obtain this information for the Cisco 10000 Series SIP-600.

**Examples**

**Example of the show controllers modular-cable Command that displays BPI key information stored on the Cisco uBR-MC3GX60V line card.**

The following is a sample output of the **show controller integrated-cable** command with the **bpi-entry** keyword:

```
Router# show controllers modular-Cable card 8/1 bpi-entry 1
```

```
BPI Index: 1 Segment: 0
Even Key: Invalid, Odd Key: Invalid
Key Sequence Number: 0 Security Association: 0x0
Key Type: DES
Even Key: 0000-0000-0000-00 IV: 0000-0000-0000-0000
Odd Key: 0000-0000-0000-00 IV: 0000-0000-0000-0000
```

Table 173 describes the significant fields shown in the display.

**Table 195** *show controller modular-cable Field Descriptions*

| Field                | Description                                                                                                                  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------|
| BPI Index            | BPI index number.                                                                                                            |
| Segment              | Hardware segment used by the DOCSIS MAC address.                                                                             |
| Even Key             | Current value of the Even Key in the BPI entry.                                                                              |
| Odd Key              | Current value of the Odd Key in the BPI entry.                                                                               |
| Key Sequence Number  | Key sequence number.                                                                                                         |
| Security Association | Security association identifier.                                                                                             |
| Key Type             | Type of key stored based on the encryption algorithm (Data Encryption Standard [DES] or Advanced Encryption Standard [AES]). |

The following is a sample output of the **show controllers modular-cable** command with **fpga\_registers**, **sfp**, and **ge\_phy** keywords. In some cases, only part of the output is shown.

Router# **show controllers modular-cable 1/0/0 fpga\_registers**

```
REG blz_sw_rev_id offset 0x00000000 = 0x00000000
REG blz_hw_rev_id offset 0x00000004 = 0x04030422
REG rst_ctrl_reg_0 offset 0x00000008 = 0x00000000
REG led_ctrl_reg_0 offset 0x00000010 = 0x00000001
REG gp_config_reg_0 offset 0x00000030 = 0x80000000
REG test_reg offset 0x000000B0 = 0xDEADBEAF
REG adr_trap_reg offset 0x000000B4 = 0x00000040
REG spa_timeout_reg offset 0x000000B8 = 0x000003E8
REG spa_error_reg offset 0x000000BC = 0x0000000A
REG bm_int_stat_reg offset 0x00000100 = 0x00000000
REG sfp_all_int_stat_reg offset 0x00000104 = 0x00000000
REG spa_brd_int_stat_reg offset 0x00000108 = 0x00000203
REG spa_brd_int_en_reg offset 0x00000120 = 0x000000CC
REG spa_brd_int_ovrd_reg offset 0x00000130 = 0x00000000
REG sfp_int_stat_reg_0 offset 0x00000200 = 0x00000000
REG sfp_cfg_stat_reg_0 offset 0x00000204 = 0x00010007
REG sfp_int_stat_reg_1 offset 0x00000208 = 0x00000000
REG sfp_cfg_stat_reg_1 offset 0x0000020C = 0x00010007
REG blz_ctrl_stat_reg offset 0x00000300 = 0x0007FF01
REG dcm_status_reg offset 0x00000304 = 0x00000009
REG blz_sp_int_stat_reg_0 offset 0x00000310 = 0x00000008
...
```

Router# **show controllers modular-cable 1/0/0 sfp port 1**

```
SFP in port 1
SFP is present
SFP LOS is not detected
SFP TX FAULT is not detected
SFP TX is enabled

ID: SFP
 Extended ID: 4
 Connector: LC
 SONET compliance: not specified
 Gigabit Ethernet compliance: 1000BASE-SX
 Fibre Channel link length: not specified
 Fibre Channel transmitter technology: not specified
 Fibre Channel transmission media: not specified
```

```

Fibre Channel speed: not specified
Encoding: 8B10B
Bit Rate: 1300 Mbps
50 micron-multimode fiber supported length: 550 m
62.5 micron-multimode fiber supported length: 270 m
Upper bit rate limit: not specified
Lower bit rate limit: not specified
Date code (yy/mm/dd): 05/02/23
Vendor name: CISCO-AGILENT
Vendor OUI: 12499
Vendor Part Number (PN): QFBR-5766LP Vendor Rev:
Vendor SN (SN): AGS090855CE
Options implemented:
 LOS Signal
 TX Fault Signal
 TX Disable Signal
Enhanced options implemented: none
Diagnostic monitoring implemented: none
Idprom contents (hex):
0x00: 03 04 07 00 00 00 01 00 00 00 01 0D 00 00 00
0x10: 37 1B 00 00 43 49 53 43 4F 2D 41 47 49 4C 45 4E
0x20: 54 20 20 20 00 00 30 D3 51 46 42 52 2D 35 37 36
0x30: 36 4C 50 20 20 20 20 20 20 20 20 03 52 00 B5
0x40: 00 1A 00 00 41 47 53 30 39 30 38 35 35 43 45 20
0x50: 20 20 20 20 30 35 30 32 32 33 20 20 00 00 00 C4
0x60: 00 00 06 C9 F0 FA 7C 01 B3 C8 41 6B 39 04 FC 85
0x70: BB 20 9E 00 00 00 00 00 00 00 00 00 B4 94 52 CC
0x80: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x90: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
State: Initalized
Phased Initialization
 Phase Reached: 4
 Phase Exit Code: 0
 Phase Read Offset: 0

Socket Verification

Router# show controllers modular-cable 1/0/0 ge_phy port 0

Gigabit PHY information for port 0:
 PHY Status:
 status (reg 1) = 0x16D
 link is up, auto-negotiation is complete
 remote fault not detected, jabber not detected
 Extended status register (reg 15) = 0xC000
 1000BaseX full duplex capable 1000BaseX half duplex capable
 phy specific status (reg 17) = 0xAC14
 link is up (real-time), speed/duplex resolved
 speed: 1000 Mbps, duplex: full
 page not received, cable length is < 50m
 MDI cross-over status: MDI, downshift status: no
 energy detect status: sleep
 transmit pause: disabled, receive pause: enabled
 polarity: normal, jabber: no
 phy specific extended status (reg 27) = 0xB487
 Fiber/ copper auto selection disabled, fiber link
 Serial interface auto-negotiation bypass enabled
 Serial interface auto-negotiation bypass status:
 Link came up because regular fiber autoneg completed
 Interrupt polarity is active low
 receive error count: 0x0

Auto-negotiation configuration and status:

```

```

Auto-negotiation is enabled and is completed
Speed/duplex is resolved to 1000 Mbps, full duplex
Advertised capabilities: 1000BaseX/HD 1000BaseX/FD Pause capable (Asymmetric)
Partner capabilities: 1000BaseX/FD
...

```

**Note**

The above command output was modified to capture the SPA sensor temperature readings and error packet information.

The error information contains details about the:

- Timestamp of the capture.
- Interrupt state when packet is captured, which indicates the error type.
- Packet length.
- Blaze header part of the packet.

The following is a sample output of the **show controllers modular-cable** command with NO error packets.

```
Router# show controllers modular-Cable 1/0/1 | b reading
```

```

WBCMTS DOCSIS SPA temperature sensor 0, reading: 25C/77F
WBCMTS DOCSIS SPA temperature sensor 1, reading: 25C/77F

```

```

Error Packets Captured on Blaze SPI Interface:
Timestamp IntStat Len BlazeHeader

```

```
Detail Packet Content: (first 80 bytes, hex format)
```

The following is a sample output of the **show controllers modular-cable** command with captured error packets.

```
Router# show controllers modular-Cable 1/0/0
```

```

SPA 0 is present
status LED: [green]
Host 12V is enabled and is okay.
Power has been enabled to the SPA.
SPA reports power enabled and okay.
SPA reports it is okay and is NOT held in reset.

```

```
..... <<< text omitted
```

```

WBCMTS DOCSIS SPA temperature sensor 0, reading: 26C/78F
WBCMTS DOCSIS SPA temperature sensor 1, reading: 25C/77F

```

```

Error Packets Captured on Blaze SPI Interface:
Timestamp IntStat Len BlazeHeader

```

```

000:00:12:49.190 C0000808 1510 00 00 00 00 00 00 01 00 00 00 00 00 00 00 0F C2 00
000:00:13:04.948 C0000808 796 00 00 00 00 00 01 00 00 00 00 00 00 00 0F C2 00
000:00:13:09.468 C0000808 60 00 00 00 00 00 01 00 00 00 00 00 00 00 0F C2 00
000:00:13:14.320 C0000808 26 00 00 00 00 00 01 00 00 00 00 00 00 00 0F C2 00
000:00:13:18.088 C0000808 496 00 00 00 00 00 01 00 00 00 00 00 00 00 0F C2 00

```

```
Detail Packet Content: (first 80 bytes, hex format)
```

```

[Entry 00]
0x00: 00 00 00 00 01 00 00 00 00 00 00 00 00 00 0F C2 00
0x10: 00 1C 9C 24 01 E0 2F 00 00 01 00 00 00 00 00 00

```

```

0x20: 00 0A 00 00 03 04 FD 00 00 48 03 FC 00 00 00 00
0x30: 00 00 00 00 00 00 00 00 05 00 00 00 80 06 12 78
0x40: 00 00 00 00 00 00 00 00 00 00 00 05 00 00 00 00
[Entry 01]
0x00: 00 00 00 00 01 00 00 00 00 00 00 00 0F C2 00
0x10: 00 1C 9C 24 01 E0 2F 00 00 01 00 00 00 00 00
0x20: 00 0A 00 00 03 04 FD 00 00 48 03 FC 00 00 00 00
0x30: 00 00 00 00 00 00 00 00 05 00 00 00 80 06 12 78
0x40: 00 00 00 00 00 00 00 00 00 00 00 05 00 00 00 00
[Entry 02]
0x00: 00 00 00 00 01 00 00 00 00 00 00 00 0F C2 00
0x10: 00 1C 9C 24 01 E0 2F 00 00 01 00 00 00 00 00
0x20: 00 0A 00 00 03 04 FD 00 00 48 03 FC 00 00 00 00
0x30: 00 00 00 00 00 00 00 00 05 00 00 00 00 00
[Entry 03]
0x00: 00 00 00 00 01 00 00 00 00 00 00 00 0F C2 00
0x10: 00 1C 9C 24 01 E0 2F 00 00 01
[Entry 04]
0x00: 00 00 00 00 01 00 00 00 00 00 00 00 0F C2 00
0x10: 00 1C 9C 24 01 E0 2F 00 00 01 00 00 00 00 00
0x20: 00 0A 00 00 03 04 FD 00 00 48 03 FC 00 00 00 00
0x30: 00 00 00 00 00 00 00 00 05 00 00 00 80 06 12 78
0x40: 00 00 00 00 00 00 00 00 00 00 00 05 00 00 00 00

```

**Note**

The temperature sensor readings in the command output shown above is specific to the Cisco IOS Release 12.3(23)BC and will not appear in the Cisco IOS Release 12.2(33)SCB and later releases.

Beginning in Cisco IOS Release 12.3(23)BC6, the command output was modified to capture the SPA environment monitoring information. The environment monitoring information includes:

Temperature sensor information:

- Sensor number
- Current sensor reading
- Low threshold
- Warning threshold
- Critical threshold
- Shutdown threshold

Voltage sensor information:

- Nominal value of the rail
- Current voltage reading
- Low shutdown threshold
- Low warning threshold
- High warning threshold
- High shutdown threshold

The following is a sample output of the **show controllers modular-cable** command that displays the SPA environment monitoring information.

```
Router# show controllers modular-cable 1/0/0 | b SPA Env
```

```

SPA Environment Monitoring Information:
Temperature sensors for SPA-24XDS-SFP[1/0]:
Sensor Reading Low Warning Critical Shutdown
0 26C 0C 58C 68C 85C
1 27C 0C 58C 68C 85C
Voltage sensors for SPA-24XDS-SFP[1/0]:
Nominal Reading LowShut LowWarn HighWarn HighShut
3.300V 3.276V 3.069V 3.135V 3.465V 3.531V
2.500V 2.485V 2.325V 2.375V 2.625V 2.675V
1.200V 1.186V 1.116V 1.140V 1.260V 1.284V
1.800V 1.801V 1.674V 1.710V 1.890V 1.926V

```

**Note**

The SPAs are shut down automatically when the sensor readings go beyond the threshold shutdown value.

In Cisco IOS Release 12.2(33)SCC, when the primary link on the SPA toggles more than five times within 30 seconds, and the backup link is UP, the backup link is selected for traffic. The link switches back to the primary link during the next primary link transition after 30 seconds or when the backup link fails. The **show controllers modular-cable** command output was modified to capture the toggle information.

The following is a sample output of the **show controllers modular-cable** command that displays the toggle information.

```

Router# show controllers modular-cable 1/1/0

SPA 1 is present
status LED: [green]
Host 12V is enabled and is okay.
Power has been enabled to the SPA.
SPA reports power enabled and okay.
SPA reports it is okay and is NOT held in reset.

Gigabit Ethernet Port Selected : Port 0
Receive Interface : Out of Reset
Receive Interface : Enabled
Transmit Interface : Out of Reset
Transmit Interface : Enabled
Primary Receive Clock : Enabled
Backup Receive Clock : Enabled
SFP [Port 0] : 1000BASE-SX Present
Tx Enabled , LOS Not Detected , TxFault Not Detected
Link Status [Port 0] : UP

Primary port Link Up Events : 2
Primary port Link Down Events : 0
Backup port Link Up Events : 2
Backup port Link Down Events : 0
Current Link Toggle Count : 0
Link Toggle Suppressed : TRUE
Link Toggle Suppress Events : 0

SFP [Port 1] : 1000BASE-SX Present
Tx Enabled , LOS Not Detected , TxFault Not Detected
Link Status [Port 1] : UP

Wideband Channel information
Channel RF bitmap Police Info: Bytes Interval
0 0x7 0 0 ms
1 0xC 0 0 ms

```



|    |     |   |      |
|----|-----|---|------|
| 2  | 0x0 | 0 | 0 ms |
| 3  | 0x0 | 0 | 0 ms |
| 4  | 0x0 | 0 | 0 ms |
| 5  | 0x0 | 0 | 0 ms |
| 6  | 0x0 | 0 | 0 ms |
| 7  | 0x0 | 0 | 0 ms |
| 8  | 0x0 | 0 | 0 ms |
| 9  | 0x0 | 0 | 0 ms |
| 10 | 0x0 | 0 | 0 ms |
| 11 | 0x0 | 0 | 0 ms |

The following is a sample output for the **rf-channel** keyword:

Router# **show controllers Modular-Cable 8/1/0 rf-channel**

| Ctrl | Chan | Frequency | Mod | Annex | IP Address    | MAC Address    | DEPI Remote ID |
|------|------|-----------|-----|-------|---------------|----------------|----------------|
| 0    | 0    | 453000000 | 256 | B     | 10.31.136.100 | 0022.9084.4e3f | 101231         |
| 0    | 1    | 459000000 | 256 | B     | 10.31.136.100 | 0022.9084.4e3f | 101232         |
| 0    | 2    | 465000000 | 256 | B     | 10.31.136.100 | 0022.9084.4e3f | 101233         |
| 0    | 3    | 471000000 | 256 | B     | 10.31.136.100 | 0022.9084.4e3f | 101234         |
| 0    | 4    | 477000000 | 256 | B     | 10.31.136.100 | 0022.9084.4e3f | 101241         |
| 0    | 5    | 483000000 | 256 | B     | 10.31.136.100 | 0022.9084.4e3f | 101242         |
| 0    | 6    | 489000000 | 256 | B     | 10.31.136.100 | 0022.9084.4e3f | 101243         |
| 0    | 7    | 495000000 | 256 | B     | 10.31.136.100 | 0022.9084.4e3f | 101244         |
| 0    | 8    | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 9    | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 10   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 11   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 12   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 13   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 14   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 15   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 16   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 17   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 18   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 19   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 20   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 21   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 22   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |
| 0    | 23   | 0         | 64  | B     | 0.0.0.0       | 0000.0000.0000 | 0              |

Router# **show controllers Modular-Cable 8/1/0 rf-channel 7**

| Ctrl | Chan | Frequency | Mod | Annex | IP Address    | MAC Address    | DEPI Remote ID |
|------|------|-----------|-----|-------|---------------|----------------|----------------|
| 0    | 7    | 495000000 | 256 | B     | 10.31.136.100 | 0022.9084.4e3f | 101244         |

The following is a sample output for the **wideband-channel** keyword:

Router# **show controllers Modular-Cable 8/1/0 wideband-channel**

| WB<br>channel          | BG<br>ID | Primary<br>BG |
|------------------------|----------|---------------|
| Wideband-Cable8/1/0:0  | 1377     | Yes           |
| Wideband-Cable8/1/0:1  | 1378     | Yes           |
| Wideband-Cable8/1/0:2  | 1379     | Yes           |
| Wideband-Cable8/1/0:3  | 1380     | Yes           |
| Wideband-Cable8/1/0:4  | 1381     | Yes           |
| Wideband-Cable8/1/0:5  | 1382     | Yes           |
| Wideband-Cable8/1/0:6  | 1383     | Yes           |
| Wideband-Cable8/1/0:7  | 1384     | Yes           |
| Wideband-Cable8/1/0:8  | 1385     | Yes           |
| Wideband-Cable8/1/0:9  | 1386     | Yes           |
| Wideband-Cable8/1/0:10 | 1387     | Yes           |
| Wideband-Cable8/1/0:11 | 1388     | Yes           |

## ■ show controllers modular-cable

```

Wideband-Cable8/1/0:12 1389 Yes
Wideband-Cable8/1/0:13 1390 Yes
Wideband-Cable8/1/0:14 1391 Yes
Wideband-Cable8/1/0:15 1392 Yes
Wideband-Cable8/1/0:16 1393 Yes
Wideband-Cable8/1/0:17 1394 Yes
Wideband-Cable8/1/0:18 1395 Yes
Wideband-Cable8/1/0:19 1396 Yes
Wideband-Cable8/1/0:20 1397 Yes
Wideband-Cable8/1/0:21 1398 Yes
Wideband-Cable8/1/0:22 1399 Yes
Wideband-Cable8/1/0:23 1400 Yes
Wideband-Cable8/1/0:24 1401 Yes
Wideband-Cable8/1/0:25 1402 Yes
Wideband-Cable8/1/0:26 1403 Yes
Wideband-Cable8/1/0:27 1404 Yes
Wideband-Cable8/1/0:28 1405 Yes
Wideband-Cable8/1/0:29 1406 Yes
Wideband-Cable8/1/0:30 1407 Yes
Wideband-Cable8/1/0:31 1408 Yes

```

```
Router# show controllers Modular-Cable 8/1/0 wideband-channel 0
```

```

WB BG Primary
channel ID BG
Wideband-Cable8/1/0:0 1377 Yes

```

The following is a sample output of the **show controllers modular-cable mapping** command:

```
router# show controllers modular-cable mapping
```

```

Ctrlr RF MC MC Rem. WB WB WB Rem.
 channel BW % Ratio channel BW % Ratio
5/1/0 2 0 0 0

```

Effective with Cisco IOS Release 12.2(33)SCH, the Bonding Across 3G60 Controllers Support feature is introduced. The following example shows the output of the **show controllers modular-cable mapping** command to display bonding of RF channels across 3G60 controllers:

```
Router#show controllers modular-cable 7/0/0 mapping rf-channel 21
```

```

Ctrlr RF MC MC Rem. WB WB WB Rem.
 channel BW % Ratio channel BW % Ratio
7/0/0 21 0 0 7/0/0:0 10 1
 7/0/1:30 10 1

```

```
Router#show controllers modular-cable 7/0/1 mapping wb-channel 30
```

```

Ctrlr WB RF BW % Remaining
 channel channel
7/0/1 30 7/0/0:20 10 1

```

The output of the *rf-channel* keyword above shows that the RF channel number 21 belongs to wideband interface bonding group 0 on controller 0 and bonding group 30 on controller 1, with 10 percent bandwidth allocated to it on each controller.

The following is a sample output of the **show controllers modular-cable registers** command:

```
router# show controllers modular-Cable 5/1/0 registers
```

```
JIB3_DS BPI registers (base address 0xF8880000)
```

```

bpi_int_isr_0 [0x00000000] = 0x00000000
bpi_int_ier_0 [0x00000004] = 0x0000000F
glb_int_isr_0 [0x00000010] = 0x00000000
glb_int_ier_0 [0x00000014] = 0x00001EFF
glb_int_isr_1 [0x00000020] = 0x00000000
glb_int_ier_1 [0x00000024] = 0x00001EFF
col_chip_mode_reg [0x00000030] = 0x00000001
bpi_int_fesr_0 [0x00000040] = 0x00000000
bpi_tst_tp_sel_reg [0x00000050] = 0x00000000
bpi_tst_tp_reg [0x00000054] = 0x00000000
bpi_cnt_good_packet_in_cnt [0x00000064] = 0x00013418
bpi_cnt_bad_packet_in_cnt [0x00000068] = 0x00000000
bpi_cnt_good_packet_out_cnt [0x0000006C] = 0x00013418
bpi_cnt_bad_packet_out_cnt [0x00000070] = 0x00000000
bpi_ecc_sbit_err_cnt [0x00000074] = 0x00000000
glb_sw_rev_id [0x00000078] = 0x00020002
glb_hw_rev_id [0x0000007C] = 0x0001000D
frz_reg [0x00000080] = 0x00000000
frz_en [0x00000084] = 0x00000001
glb_dcm_status [0x00000088] = 0x00000007
glb_sw_rst [0x0000008C] = 0x00000000

```

The following is a sample output for the **dsid-log** keyword:

Router# **show controllers modular-Cable 1/0/0 dsid-log search 1 1000**

```

SPA 0 DSID Info Log Count 17
Entry 5
00y:000d:00h:03m:11.908 ds_stat_index=00022 dsid=0x001A8 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00009 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 6
00y:000d:00h:03m:11.972 ds_stat_index=00021 dsid=0x001A0 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00010 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 7
00y:000d:00h:03m:12.208 ds_stat_index=00024 dsid=0x001B8 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00011 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 8
00y:000d:00h:03m:12.632 ds_stat_index=00023 dsid=0x001B0 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00012 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 9
00y:000d:00h:27m:13.024 ds_stat_index=00021 dsid=0x00000 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00010 WbIdx=000000 old_dsid=0x001A0 MD=01 (5/0/1) IPC_Port=0x000C0000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_CLEAR_CLEANUP
Entry 10
00y:000d:00h:27m:13.090 ds_stat_index=00022 dsid=0x00000 seq_num_b4=0x00001
1st_seq_num=0x00001
slotIdx=10 5/0 sid=00009 WbIdx=000000 old_dsid=0x001A8 MD=01 (5/0/1) IPC_Port=0x000C0000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_CLEAR_CLEANUP

```

## ■ show controllers modular-cable

```

Entry 11
00y:000d:00h:27m:13.156 ds_stat_index=00023 dsid=0x00000 seq_num_b4=0x00001
1st_seq_num=0x00001
slotIdx=10 5/0 sid=00012 WbIdx=000000 old_dsid=0x001B0 MD=01 (5/0/1) IPC_Port=0x000C0000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_CLEAR_CLEANUP
Entry 12
00y:000d:00h:27m:13.220 ds_stat_index=00024 dsid=0x00000 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00011 WbIdx=000000 old_dsid=0x001B8 MD=01 (5/0/1) IPC_Port=0x000C0000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_CLEAR_CLEANUP
Entry 13
00y:000d:00h:29m:30.388 ds_stat_index=00025 dsid=0x001C0 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00013 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 14
00y:000d:00h:29m:32.544 ds_stat_index=00026 dsid=0x001C8 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00014 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 15
00y:000d:00h:29m:36.446 ds_stat_index=00028 dsid=0x001D8 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00016 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 16
00y:000d:00h:29m:36.970 ds_stat_index=00027 dsid=0x001D0 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00015 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
SPA 0 DSID Suspect Count 0
No entries in the DSID Suspect List Log for SPA 0

```

The following is a sample output with the **stat-index-log** keyword:

```

Router# show controllers modular-Cable 1/0/0 stat-index-log search 1 1000
SPA 0 DSID Info Log Count 17
Entry 5
00y:000d:00h:03m:11.908 ds_stat_index=00022 dsid=0x001A8 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00009 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 6
00y:000d:00h:03m:11.972 ds_stat_index=00021 dsid=0x001A0 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00010 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 7
00y:000d:00h:03m:12.208 ds_stat_index=00024 dsid=0x001B8 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00011 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GblIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 8
00y:000d:00h:03m:12.632 ds_stat_index=00023 dsid=0x001B0 seq_num_b4=0x00000
1st_seq_num=0x00000

```

```

slotIdx=10 5/0 sid=00012 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GbIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 9
00y:000d:00h:27m:13.024 ds_stat_index=00021 dsid=0x00000 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00010 WbIdx=000000 old_dsid=0x001A0 MD=01 (5/0/1) IPC_Port=0x000C0000
this_bay=0
GbIdx=000000 slot=0 bay=0 src_thread=DSID_CLEAR_CLEANUP
Entry 10
00y:000d:00h:27m:13.090 ds_stat_index=00022 dsid=0x00000 seq_num_b4=0x00001
1st_seq_num=0x00001
slotIdx=10 5/0 sid=00009 WbIdx=000000 old_dsid=0x001A8 MD=01 (5/0/1) IPC_Port=0x000C0000
this_bay=0
GbIdx=000000 slot=0 bay=0 src_thread=DSID_CLEAR_CLEANUP
Entry 11
00y:000d:00h:27m:13.156 ds_stat_index=00023 dsid=0x00000 seq_num_b4=0x00001
1st_seq_num=0x00001
slotIdx=10 5/0 sid=00012 WbIdx=000000 old_dsid=0x001B0 MD=01 (5/0/1) IPC_Port=0x000C0000
this_bay=0
GbIdx=000000 slot=0 bay=0 src_thread=DSID_CLEAR_CLEANUP
Entry 12
00y:000d:00h:27m:13.220 ds_stat_index=00024 dsid=0x00000 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00011 WbIdx=000000 old_dsid=0x001B8 MD=01 (5/0/1) IPC_Port=0x000C0000
this_bay=0
GbIdx=000000 slot=0 bay=0 src_thread=DSID_CLEAR_CLEANUP
Entry 13
00y:000d:00h:29m:30.388 ds_stat_index=00025 dsid=0x001C0 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00013 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GbIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 14
00y:000d:00h:29m:32.544 ds_stat_index=00026 dsid=0x001C8 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00014 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GbIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 15
00y:000d:00h:29m:36.446 ds_stat_index=00028 dsid=0x001D8 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00016 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GbIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
Entry 16
00y:000d:00h:29m:36.970 ds_stat_index=00027 dsid=0x001D0 seq_num_b4=0x00000
1st_seq_num=0x00000
slotIdx=10 5/0 sid=00015 WbIdx=000000 old_dsid=0x00000 MD=01 (5/0/1) IPC_Port=0x00010000
this_bay=0
GbIdx=000000 slot=0 bay=0 src_thread=DSID_UPDATE
SPA 0 DSID Suspect Count 0
No entries in the DSID Suspect List Log for SPA 0

```

The following is a sample output with the **dsid-ref-log** keyword:

```
Router# show controllers modular-Cable 1/0/0 dsid-ref-log dsid 0xf000
```

```
dsid = 61440(0xF000) last_stat_index = 64936 ref_count = 1
```

## Related Commands

 show controllers modular-cable

| Command                 | Description                            |
|-------------------------|----------------------------------------|
| show controllers jacket | Displays Wideband SIP register values. |

# show controllers usb

To display the current state information for the USB interface and its controller, use the **show controllers usb** command in privileged EXEC mode.

**Cisco uBR925 cable access router, Cisco CVA122 Cable Voice Adapter**

**show controllers usb** *number*

|                           |                                                                |
|---------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> Identifies the USB interface (always <b>0</b> ). |
|---------------------------|----------------------------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

|                        |                |                                                                       |
|------------------------|----------------|-----------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                   |
|                        | 12.1(5)XU1     | This command was introduced for the Cisco CVA122 Cable Voice Adapter. |
|                        | 12.2(2)XA      | Support was added for the Cisco uBR925 cable access router.           |

**Examples** The following example shows sample output from the **show controllers usb** command:

```
Router# show controllers usb 0

PQUICC Ethernet unit 0 using SCC2, Microcode ver 3392
Current station address 0001.64f9.22fc, default address 0001.64f9.22fc
idb at 0x80B478EC, driver data structure at 0x80B4966C
SCC Registers:
General [GSMR]=0x0:0x1088003C, Protocol-specific [PSMR]=0x80A
Events [SCCE]=0x0000, Mask [SCCM]=0x001F, Status [SCCS]=0x0002
Transmit on Demand [TODR]=0x0, Data Sync [DSR]=0xD555
Interrupt Registers:
Config [CICR]=0x001B9F80, Pending [CIPR]=0x00000C00
Mask [CIMR]=0x60020010, In-srv [CISR]=0x00000000
Command register [CR]=0x640
Port A [PADIR]=0x00C0, [PAPAR]=0x0F0F
 [PAODR]=0x00F3, [PADAT]=0x004F
Port B [PBDIR]=0x00F32F, [PBPAR]=0x0020D0
 [PBODR]=0x008000, [PBDAT]=0x0053EF
Port C [PCDIR]=0x030C, [PCPAR]=0x0300
 [PCSO]=0x00F0, [PCDAT]=0x050C, [PCINT]=0x0000
Port D [PDDIR]=0x001EF7, [PDPAR]=0x000000
 [PDDAT]=0x000FBA
SI [SIMODE]=0x00001000, [SIGMR]=0x00, [SISTR]=0x00
 [SICR]=0x00002628
BRGC [BRGC1]=0x00018008, [BRGC2]=0x000101FA
 [BRGC3]=0x00000000, [BRGC4]=0x00000000

SCC GENERAL PARAMETER RAM (at 0x10783D00)
Rx BD Base [RBASE]=0x2800, Fn Code [RFCR]=0x18
Tx BD Base [TBASE]=0x2880, Fn Code [TFCR]=0x18
Max Rx Buff Len [MRBLR]=1520
Rx State [RSTATE]=0x0, BD Ptr [RBPTR]=0x2800
```

```

Tx State [TSTATE]=0x18000AE3, BD Ptr [TBPTR]=0x2890

SCC ETHERNET PARAMETER RAM (at 0x10783D30)
CRC Preset [C_PRES]=0xFFFFFFFF, Mask [C_MASK]=0xDEBB20E3
Errors: CRC [CRCEC]=0, Alignment [ALEC]=0, Discards [DISFC]=0
PAD Char [PADS]=0x0
Retry Limit [RET_LIM]=15, Count [RET_CNT]=15
Frame Lengths: [MAXFLR]=1518, [MINFLR]=64
Max DMA Lengths: [MAXD1]=1518, [MAXD2]=1518
Group Address Filter [GADDRn]=0420:0000:0420:0100
Indiv Address Filter [IADDRn]=0000:0000:0000:0000
Physical Address [PADDR1]=FFFFFFC22.FFFFF964.0100
Last Address Set in Filter [TADDR]=FFFFCDCC.FFFFCC0C.0001
Persistence [P_Per]=0, Backoff Cnt [BOFF_CNT]=0
BD Pointers:
First Rx [RFBD]=0x0, First Tx [TFBD]=0x2890, Last Tx [TLBD]=0x2888

RX ring with 16 entries at 0x10782800, Buffer size 1524
Rxhead = 0x10782800 (0), Rxp = 0x80B49688 (0)
00 pak=0x80B4D9EC buf=0x10032A9C status=9000 pak_size=0
01 pak=0x80B4D728 buf=0x100323E0 status=9000 pak_size=0
02 pak=0x80B4D464 buf=0x10031D24 status=9000 pak_size=0
03 pak=0x80B4D1A0 buf=0x10031668 status=9000 pak_size=0
04 pak=0x80B4CEDC buf=0x10030FAC status=9000 pak_size=0
05 pak=0x80B4CC18 buf=0x100308F0 status=9000 pak_size=0
06 pak=0x80B4C954 buf=0x10030234 status=9000 pak_size=0
07 pak=0x80B4C690 buf=0x1002FB78 status=9000 pak_size=0
08 pak=0x80B4C3CC buf=0x1002F4BC status=9000 pak_size=0
09 pak=0x80B4C108 buf=0x1002EE00 status=9000 pak_size=0
10 pak=0x80B4BE44 buf=0x1002E744 status=9000 pak_size=0
11 pak=0x80B4BB80 buf=0x1002E088 status=9000 pak_size=0
12 pak=0x80B4B8BC buf=0x1002D9CC status=9000 pak_size=0
13 pak=0x80B4B5F8 buf=0x1002D310 status=9000 pak_size=0
14 pak=0x80B4B334 buf=0x1002CC54 status=9000 pak_size=0
15 pak=0x80B4B070 buf=0x1002C598 status=B000 pak_size=0

TX ring with 4 entries at 0x10782880, tx_count = 0
tx_head = 0x10782890 (2), head_txp = 0x80B496EC (2)
tx_tail = 0x10782890 (2), tail_txp = 0x80B496EC (2)
00 pak=0x00000000 buf=0x00000000 status=0000 pak_size=0
01 pak=0x00000000 buf=0x00000000 status=0000 pak_size=0
02 pak=0x00000000 buf=0x00000000 status=0000 pak_size=0
03 pak=0x00000000 buf=0x00000000 status=2000 pak_size=0
32 missed datagrams, 0 overruns
0 transmitter underruns, 0 excessive collisions
0 single collisions, 0 multiple collisions
0 dma memory errors, 0 CRC errors

0 alignment errors, 0 runts, 0 giants
PQUICC SCC specific errors:
32 buffer errors, 0 overflow errors
0 input aborts on late collisions
0 heartbeat failures, 0 cumulative deferred
0 throttles, 0 enables
Router#

```

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.



| Related Commands | Command             | Description                                                 |
|------------------|---------------------|-------------------------------------------------------------|
|                  | interface usb       | Enters interface configuration mode for the USB interface.  |
|                  | show interfaces usb | Displays configuration information about the USB interface. |

# show cops servers

To display Common Open Polic Server (COPS) server addresses, ports, states, keepalives, and policy client information, use the **show cops server** command in privileged EXEC mode.

**show cops servers**

**Syntax Description** No additional keywords or arguments

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.3(13a)BC | This command was introduced. |

**Usage Guidelines** For additional information about this feature and related commands, refer to the following document on Cisco.com:

- *COPS Engine Operation on the Cisco CMTS*

**Examples** The following example illustrates the use of the **show cops server** command.

```
Router# show cops servers
```

```
COPS SERVER: Address: 161.44.135.172. Port: 3288. State: 0. Keepalive: 120 sec
Number of clients: 1. Number of sessions: 1.
COPS CLIENT: Client type: 1. State: 0.
```

The following example displays the policy server address, state, keepalives, and policy client information:

```
Router# show cops servers
```

```
COPS SERVER: Address: 161.44.135.172. Port: 3288. State: 0. Keepalive: 120 sec
Number of clients: 1. Number of sessions: 1.
COPS CLIENT: Client type: 1. State: 0.
```

| Related Commands | Command                           | Description                                                                                                                                                   |
|------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cops ip dscp</b>               | Specifies the Common Open Policy Service (COPS) Differentiated Services Code Point (DSCP) markings for COPS messages that are transmitted by the Cisco router |
|                  | <b>cops listeners access-list</b> | Configures access control lists (ACLs) for inbound connections to all COPS listener applications on the Cisco CMTS.                                           |
|                  | <b>cops tcp window-size</b>       | Overrides the default TCP receive window size that is used by COPS processes.                                                                                 |

| Command                               | Description                                                                                       |
|---------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>debug packetcable cops</b>         | Enables debugging processes for PacketCable with the COPS engine.                                 |
| <b>debug packetcable gate control</b> | Enables and displays debugging processes for PacketCable gate control.                            |
| <b>debug packetcable subscriber</b>   | Enables and displays debugging processes for PacketCable subscribers.                             |
| <b>show debug</b>                     | Displays current debugging information that includes PacketCable COPS messages on the Cisco CMTS. |
| <b>show ip rsvp policy</b>            | Displays policy server addresses, ACL IDs, and client/server connection status.                   |

# show cpd

To display the CPD functionality state, use the **show cpd** command in privileged EXEC mode.

**show cpd**

|                        |                                             |
|------------------------|---------------------------------------------|
| <b>Command Default</b> | Information for the CPD state is displayed. |
|------------------------|---------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| <b>Command History</b> | Release      | Modification                 |
|------------------------|--------------|------------------------------|
|                        | 12.3(21a)BC3 | This command was introduced. |

|                 |                                                                        |
|-----------------|------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows the output of the <b>show cpd</b> command: |
|-----------------|------------------------------------------------------------------------|

```
Router# show cpd
CPD enabled
CR ID :12345
```

| <b>Related Commands</b> | Command | Description  |
|-------------------------|---------|--------------|
|                         | cpd     | Enables CPD. |

# show cr10k-rp cable

**Note**

This command is meant for engineering debugging, and not for general customer use.

To display packet processing information for a particular service ID (SID) on a cable interface, use the **show cr10k-rp cable** command in user EXEC or privileged EXEC mode.

```
show cr10k-rp cable slot/subslot/port sid {classifier | mac-rw-index | queue | service-flow {ds | us}}
```

**Syntax Description**

|                                       |                                                                                                                                                                                                                                                                                    |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b> <i>slot/subslot/port</i> | Identifies the cable interface on the Cisco uBR10012 router for which information should be displayed, where: <ul style="list-style-type: none"><li>• <i>slot</i>—0 to 8</li><li>• <i>subslot</i>—0 or 1</li><li>• <i>port</i>—0 to 4 (depending on the cable interface)</li></ul> |
| <i>sid</i>                            | (Optional) Identifies the service ID (SID) for which information should be displayed.                                                                                                                                                                                              |
| <b>classifier</b>                     | Displays classifier information for the SID.                                                                                                                                                                                                                                       |
| <b>mac-rw-index</b>                   | Displays the MAC rewrite index for the SID.                                                                                                                                                                                                                                        |
| <b>queue</b>                          | Displays information about the output packet queues for the modem identified by the SID.                                                                                                                                                                                           |
| <b>service-flow ds</b>                | Displays the information of the downstream service-flows for the modem identified by the SID.                                                                                                                                                                                      |
| <b>service-flow us</b>                | Displays the information of the upstream service-flows for the modem identified by the SID.                                                                                                                                                                                        |

**Defaults**

No default behavior or values.

**Command Modes**

User EXEC (>)  
Privileged EXEC (#)

**Command History**

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced for the Cisco uBR10012 router.      |
| 12.3BC      | This command was integrated into Cisco IOS release 12.3BC.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS release 12.2(33)SCA. |

**Usage Guidelines**

The **show cr10k-rp cable** command displays information that the PRE routing processor (RP) module has about a particular SID. This information includes configuration information about the SID, as well as internal status information that is useful only to Cisco engineers in troubleshooting problems.

**Examples**

The following example shows typical output for the **show cr10k-rp cable** command for a SID that identifies a cable modem:

```
Router# show cr10k-rp c6/1/0 2 classifier
Mac Rw Index: 5CCB Index: 7
CM Classifiers:
id=4, sfid=14 CFR Index 16396 RP sfindex 16396,
 prio=10, sip=0.0.0.0, sip mask=0.0.0.0
 dip=0.0.0.0, dip mask=0.0.0.0, prot=17, tos=A0,E0
 sport = 0,750, dport = 1024,10000 matches = 0

id=2, sfid=13 CFR Index 16395 RP sfindex 16395,
 prio=9, sip=0.0.0.0, sip mask=0.0.0.0
 dip=0.0.0.0, dip mask=0.0.0.0, prot=17, tos=A0,E0
 sport = 0,65535, dport = 0,65535 matches = 0

id=3, sfid=12 CFR Index 16394 RP sfindex 16394,
 prio=8, sip=9.0.0.0, sip mask=255.255.0.0
 dip=1.11.22.0, dip mask=255.255.255.0, prot=256, tos=0,FF
 sport = 0,65535, dport = 0,65535 matches = 0

id=1, sfid=11 CFR Index 16393 RP sfindex 16393,
 prio=7, sip=0.0.0.0, sip mask=0.0.0.0
 dip=1.11.22.0, dip mask=255.255.255.0, prot=256, tos=0,FF
 sport = 0,65535, dport = 0,65535 matches = 0
```

The following example shows typical output for the **show cr10k-rp classifier** command for a SID that identifies a customer premises equipment (CPE) device:

```
Router# show cr10k-rp c6/0/0 70 classifier

CPE Classifiers:
Mac Rw Index: 390 CCB Index: 97
id=7, sfid=205 CFR Index 16484 RP sfindex 16484,
 prio=255, sip=0.0.0.0, sip mask=0.0.0.0
 dip=15.0.0.1, dip mask=255.255.255.255, prot=257, tos=0,FF
 sport = 0,65535, dport = 1001,1001 matches = 0

id=1, sfid=199 CFR Index 16478 RP sfindex 16478,
 prio=25, sip=0.0.0.0, sip mask=0.0.0.0
 dip=0.0.0.0, dip mask=0.0.0.0, prot=257, tos=0,FF
 sport = 0,65535, dport = 1000,1000 matches = 0

id=5, sfid=203 CFR Index 16482 RP sfindex 16482,
 prio=0, sip=0.0.0.0, sip mask=0.0.0.0
 dip=15.0.0.1, dip mask=255.255.255.255, prot=256, tos=0,FF
 sport = 0,65535, dport = 0,65535 matches = 0

id=0, sfid=0 CFR Index 0 RP sfindex 0,
 prio=0, sip=0.0.0.0, sip mask=0.0.0.0
 dip=0.0.0.0, dip mask=0.0.0.0, prot=0, tos=2,1
 sport = 1000,500, dport = 1000,500 matches = 0

CPE Classifiers:
Mac Rw Index: 387 CCB Index: 93
id=4, sfid=202 CFR Index 16481 RP sfindex 16481,
 prio=255, sip=0.0.0.0, sip mask=0.0.0.0
 dip=14.0.0.1, dip mask=255.255.255.255, prot=17, tos=0,FF
 sport = 0,65535, dport = 0,65535 matches = 0

id=1, sfid=199 CFR Index 16478 RP sfindex 16478,
 prio=25, sip=0.0.0.0, sip mask=0.0.0.0
 dip=0.0.0.0, dip mask=0.0.0.0, prot=257, tos=0,FF
 sport = 0,65535, dport = 1000,1000 matches = 0

id=0, sfid=0 CFR Index 0 RP sfindex 0,
```

```

prio=0, sip=0.0.0.0, sip mask=0.0.0.0
dip=0.0.0.0, dip mask=0.0.0.0, prot=0, tos=2,1
sport = 1000,500, dport = 1000,500 matches = 0

id=0, sfid=0 CFR Index 0 RP sfindex 0,
prio=0, sip=0.0.0.0, sip mask=0.0.0.0
dip=0.0.0.0, dip mask=0.0.0.0, prot=0, tos=2,1
sport = 1000,500, dport = 1000,500 matches = 0

```

The following example shows typical output for the **mac-rw-index** option:

```
Router# show cr10k-rp c8/0/0 1 mac-rw-index
```

```

CPE Information for Interface Cable8/0/0 SID 1:
 Link Table Slot: 17 Mac-rw-index: 17

```

```
Router# show cr10k-rp c8/0/0 2 mac-rw-index
```

```

CPE Information for Interface Cable8/0/0 SID 2:
 Link Table Slot: 18 Mac-rw-index: 18

```

```
Router#
```



**Tip**

To display more information about the max-rw-index, use the **show pxf cpu cef** command to display information for a specific IP address. The output of this command shows the max-rw-index value in the “rw\_index” field.

The following example shows typical output for the **show cr10k-rp queue** command:

```
Router# show cr10k-rp c6/1/0 1 queue
```

```

RP SFID 16384 LC SFID 4
Queue Index: 293 QID 293 VCCI 6162 ClassID 5 Refcount 1
 Priority: Lo Rates:(Act/Conf) CIR 0/0 MIR 6067/6067 EIR 1260/1260
 Statsitics: Length 0 Pkts 1 Octets 52 TailDrops 0 BufferDrops 0

```

```

RP SFID 16385 LC SFID 7
Queue Index: 294 QID 294 VCCI 6162 ClassID 6 Refcount 1
 Priority: Lo Rates:(Act/Conf) CIR 0/0 MIR 0/1820 EIR 0/1260
 Statsitics: Length 0 Pkts 0 Octets 0 TailDrops 0 BufferDrops 0

```

```

RP SFID 16386 LC SFID 8
Queue Index: 295 QID 295 VCCI 6162 ClassID 7 Refcount 1
 Priority: Lo Rates:(Act/Conf) CIR 0/0 MIR 0/2427 EIR 0/1260
 Statsitics: Length 0 Pkts 0 Octets 0 TailDrops 0 BufferDrops 0

```

```
ubr-45#show cr10k-rp mod 1/2/0:0 queue
```

```
BE Queues:
```

```

Queue Index: 131241, GlobalQID 71, CBLT ID 131241
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32881, lc_sfindex 29, min_rate(bps) 0, max_rate(bps) 0

```

```
CIR Queues:
```

```

Queue Index: 2049, GlobalQID 70, CBLT ID 2049
 MinRate(Kbps) 100, ExcessRatio 32, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32880, lc_sfindex 8, min_rate(bps) 100000, max_rate(bps) 0

```

```
LL Queues:
```

The following example shows typical output for the **show cr10k-rp service-flow** command for both the downstream and upstream directions:

```
Router# show cr10k-rp c8/0/0 1 service-flow ds

RP DS SFID LC SFID Bytes Packets QID

16385 4 0 0 261

Router# show cr10k-rp c8/0/0 1 service-flow us

SFID SID

3 1
```

| Related Commands | Command             | Description                                                         |
|------------------|---------------------|---------------------------------------------------------------------|
|                  | show cr10k-rp queue | Displays information about the packet queues for a cable interface. |



# show cr10k-rp controller



**Note** This command is meant only for engineering debugging, and not for general customer use.

To display packet processing information for a particular service ID (SID) on a cable interface, use the **show cr10k-rp controller** command in user EXEC or privileged EXEC mode.

**Cisco IOS Releases 12.3(21)BC, 12.3(23)BC, and 12.2(33)SCA**

**show cr10k-rp controller modular-cable** *slot/subslot/port* {**lblt** | **pblt**}

**Cisco IOS Release 12.2(33)SCB**

**show cr10k-rp controller modular-cable** *slot/bay/port* {**lblt** | **pblt**}

**Cisco IOS Release 12.2(33)SCF**

**show cr10k-rp controller modular-cable** *slot/subslot/unit* {**acfe** [**cluster** *cluster-index*] | **lblt** | **pblt**}

| Syntax Description |                                              |                                                                                                                                                                                                                                                                                      |
|--------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <b>modular-cable</b><br><i>slot/bay/port</i> | Identifies the cable interface on the Cisco uBR10012 router for which information should be displayed, where: <ul style="list-style-type: none"><li><i>slot</i>—0 to 8</li><li><i>bay</i>—0 or 1</li><li><i>subslot</i>—0 to 3</li><li><i>port</i>—0</li><li><i>unit</i>—0</li></ul> |
|                    | <b>acfe</b>                                  | Identifies the Logical Bandwidth Limiting Traffic (LBLT) associated with the RF Physical Logical Bandwidth Limiting Traffic (PBLT). <ul style="list-style-type: none"><li><i>cluster-index</i>—Cluster index. The valid values range from 0 to 31.</li></ul>                         |
|                    | <b>lblt</b>                                  | Identifies the LBLT associated with the RF PBLT.                                                                                                                                                                                                                                     |
|                    | <b>pblt</b>                                  | Identifies the PBLTs associated with the RF Channels.                                                                                                                                                                                                                                |

| Command Modes | User EXEC (>)<br>Privileged EXEC (#) |
|---------------|--------------------------------------|
|---------------|--------------------------------------|

| Command History | Release     | Modification                                                                                                |
|-----------------|-------------|-------------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC1 | This command was introduced for the Cisco uBR10012 router.                                                  |
|                 | 12.3BC      | This command was integrated into Cisco IOS release 12.3BC. The <b>modular-cable</b> keyword was introduced. |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS release 12.2(33)SCA.                                             |

| Release     | Modification                                                                                                                                                                 |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCB | This command was modified. The addressing format for the modular-cable interface and wideband-cable interface changed from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |
| 12.2(33)SCF | This command was modified. The <b>acfe</b> keyword was added.                                                                                                                |

### Usage Guidelines

The **show cr10k-rp controller** command displays information that the PRE route processor (RP) module has for a particular SID. This information includes configuration information about the SID, as well as internal status information that is useful only to Cisco engineers during troubleshooting.

### Examples

The following examples show sample outputs for the **show cr10k-rp controller** command for a SID that identifies a cable modem:

```
Router# show cr10k-rp controller modular-cable 1/1/0 lblt
```

LBLTs on each RF Channel's PBLT

| RFChnl | WBChnl/LBLTGrp | LBLTId | Weight/Quantum |
|--------|----------------|--------|----------------|
| 0      | -/36           | 37     | 1/5520         |
|        | 12/16          | 179    | 1/4478         |
| 1      | -/37           | 39     | 1/0            |
|        | 12/16          | 180    | 1/10000        |
| 2      | -/38           | 41     | 1/0            |
|        | 12/16          | 181    | 1/4473         |
|        | 31/35          | 182    | 1/5526         |
| 3      | -/39           | 43     | 1/0            |
|        | 31/35          | 183    | 1/10000        |
| 4      | -/40           | 45     | 1/0            |
| 5      | -/41           | 47     | 1/0            |
| 6      | -/42           | 49     | 1/0            |
| 7      | -/43           | 51     | 1/0            |
| 8      | -/44           | 53     | 1/0            |
| 9      | -/45           | 55     | 1/0            |
| 10     | -/46           | 57     | 1/0            |
| 11     | -/47           | 59     | 1/0            |
| 12     | -/48           | 61     | 1/0            |
| 13     | -/49           | 63     | 1/0            |
| 14     | -/50           | 65     | 1/0            |
| 15     | -/51           | 67     | 1/0            |

```
Router# show cr10k-rp controller modular-cable 1/1/0 pblt
```

RF Channel PBLTs on Modular-Cable 1/0/0

| Channel | PBLTIndex | BW(Kbps) | Flowbit(prd/ofst) | Rsrc/FlowRsrc |
|---------|-----------|----------|-------------------|---------------|
| 0       | 3         | 36000    | 512/0             | 3/3           |
| 1       | 4         | 37500    | 512/4             | 3/3           |
| 2       | 5         | 35625    | 512/8             | 3/3           |
| 3       | 6         | 37500    | 512/12            | 3/3           |
| 4       | 7         | 26000    | 512/16            | 3/3           |
| 5       | 8         | 26000    | 512/20            | 3/3           |
| 6       | 9         | 26000    | 512/24            | 3/3           |
| 7       | 10        | 26000    | 512/28            | 3/3           |
| 8       | 11        | 26000    | 512/32            | 3/3           |
| 9       | 12        | 26000    | 512/36            | 3/3           |
| 10      | 13        | 26000    | 512/40            | 3/3           |
| 11      | 14        | 26000    | 512/44            | 3/3           |

```

12 15 26000 512/48 3/3
13 16 26000 512/52 3/3
14 17 26000 512/56 3/3
15 18 26000 512/60 3/3

```

The following example shows a sample output for the **show cr10k-rp controller** command with the **acfe** keyword:

```
Router# show cr10k-rp controller modular-cable 1/1/0 acfe
```

```
Modular-Cable 1/0/0 status:
```

```
Topology changed: No
```

```
=====Cluster 0=====
```

```
Number of RF: 2
```

| RF | FlexBW | WB | GuarBW | Quanta |
|----|--------|----|--------|--------|
| 0  | 28687  | 0  | 6028   | 2101   |
|    |        | -  | 22659  | 7898   |
| 1  | 28687  | 0  | 15030  | 5239   |
|    |        | -  | 13657  | 4760   |

```
Number of BG: 3
```

```
!
!
!
```

The following example shows a sample output for the **show cr10k-rp controller** command with the **acfe** keyword for a particular cluster:

```
Router# show cr10k-rp controller modular-cable 1/1/0 acfe cluster 1
```

```
Modular-Cable 1/0/0 status:
```

```
Topology changed: No
```

```
=====Cluster 1=====
```

```
Number of RF: 2
```

| RF | FlexBW | WB | GuarBW | Quanta |
|----|--------|----|--------|--------|
| 2  | 28687  | 1  | 11695  | 4076   |
|    |        | -  | 16992  | 5923   |
| 3  | 28687  | 1  | 11696  | 4077   |
|    |        | -  | 16991  | 5922   |

```
Number of BG: 3
```

```
!
!
!
```

## Related Commands

| Command                    | Description                                                         |
|----------------------------|---------------------------------------------------------------------|
| <b>show cr10k-rp queue</b> | Displays information about the packet queues for a cable interface. |

# show cr10k-rp queue



Note

This command is meant for engineering debugging, and not for general customer use.

To display information about the packet queues for a cable interface, use the **show cr10k-rp queue** command in user EXEC or privileged EXEC mode.

Cisco IOS Releases 12.3(21)BC, 12.3(23)BC, and 12.2(33)SCA

```
show cr10k-rp { cable slot/subslot/port | modular-cable slot/subslot/port:channel |
 wideband-cable slot/subslot/port:channel } queue { be | cir | llq }
```

Cisco IOS Release 12.2(33)SCB

```
show cr10k-rp { cable slot/subslot/port | modular-cable slot/bay/port:channel | wideband-cable
 slot/bay/port:channel } queue
```

Syntax Description

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b> <i>slot/subslot/port</i>              | Identifies the cable interface on the Cisco uBR10012 router for which information should be displayed, where: <ul style="list-style-type: none"><li><i>slot</i>—0 to 8</li><li><i>subslot</i>—0 or 1</li><li><i>port</i>—0 to 4</li></ul>                                                                                                                                       |
| <b>modular-cable</b> <i>slot/bay/port:channel</i>  | Identifies the cable interface on the Cisco uBR10012 router for which information should be displayed, where: <ul style="list-style-type: none"><li><i>slot</i>—0 to 8</li><li><i>bay</i>—0 or 1</li><li><i>port</i>—0</li><li><i>channel</i>—0</li></ul> <p><b>Note</b> Support for <b>modular-cable</b> keyword was introduced in Cisco IOS Release 12.3(23)BC.</p>           |
| <b>wideband-cable</b> <i>slot/bay/port:channel</i> | Identifies the wideband-cable interface on the Cisco uBR10012 router for which information should be displayed, where: <ul style="list-style-type: none"><li><i>slot</i>—0 to 8</li><li><i>bay</i>—0 or 1</li><li><i>port</i>—0</li><li><i>channel</i>—0</li></ul> <p><b>Note</b> Support for <b>wideband-cable</b> keyword was introduced in Cisco IOS Release 12.3(21)BC.</p> |
| <b>queue</b>                                       | Displays information about the packet queues for the SID. <p><b>Note</b> Options for the keyword <b>queue</b> were removed from Cisco IOS Release 12.3(21)BC.</p>                                                                                                                                                                                                               |

**Defaults**

No default behavior or values.

**Command Modes**

User EXEC (>)

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                        |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced for the Cisco uBR10012 router.                                                                                                                          |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                          |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                     |
| 12.2(33)SCB | The addressing format for the modular-cable interface and wideband-cable interface changed from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> from Cisco IOS Release 12.2(33)SCB. |

**Usage Guidelines**

The **show cr10k-rp queue** command displays information about the queues on the Cisco uBR10012 router.

**Examples**

The following examples show typical displays for each form of the **show cr10k-rp queue** command:

```
Router# show cr10k-rp cable 7/0/0 queue
```

```

Docsis queues on the interface: 1
Total DOCSIS Queues Allocated: 19
Available/Maximal reservable rate(kbps): 26000/26000

HQF BLT Info (LBLT Group 125):
LBLT 173: wt/qntm 1/10000; PBLT 1325: BW 26000Kbps, flowbit prd/ofst 32/3, rsrc

BE Queues:
Queue Index: 131345, GlobalQID 125, CBLT ID 131345
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 10000000, QLimit 255
Service Flow(s): rp_sf_index 32925, lc_sf_id 7, min_rate(bps) 0, max_rate(bps) 10

CIR Queues:

LL Queues:
```

```
Router# show cr10k-rp modular-cable1/0/0:0 queue
```

```

Docsis queues on the interface: 9
Total DOCSIS Queues Allocated: 19
Available/Maximal reservable rate(kbps): 18750/18750

HQF BLT Info (LBLT Group 36):
LBLT 37: wt/qntm 1/5520; PBLT 3: BW 36000Kbps, flowbit prd/ofst 512/0, rsrc/flr

BE Queues:
Queue Index: 131346, GlobalQID 126, CBLT ID 131346
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 10000000, QLimit 255
Service Flow(s): rp_sf_index 32927, lc_sf_id 8, min_rate(bps) 0, max_rate(bps) 10
```

## ■ show cr10k-rp queue

```

Queue Index: 131349, GlobalQID 127, CBLT ID 131349
 MinRate(Kbps) 0, ExcessRatio 32, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32930, lc_sfid 10, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131350, GlobalQID 128, CBLT ID 131350
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32931, lc_sfid 13, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131351, GlobalQID 129, CBLT ID 131351
 MinRate(Kbps) 0, ExcessRatio 32, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32932, lc_sfid 12, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131352, GlobalQID 130, CBLT ID 131352
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32933, lc_sfid 14, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131359, GlobalQID 137, CBLT ID 131359
 MinRate(Kbps) 0, ExcessRatio 32, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32940, lc_sfid 16, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131360, GlobalQID 138, CBLT ID 131360
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32941, lc_sfid 28, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131361, GlobalQID 139, CBLT ID 131361
 MinRate(Kbps) 0, ExcessRatio 32, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32942, lc_sfid 22, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131362, GlobalQID 140, CBLT ID 131362
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32943, lc_sfid 29, min_rate(bps) 0, max_rate(bps) 0

```

CIR Queues:

LL Queues:

Router# **show cr10k-rp wideband-cable1/0/0:12 queue**

```

Docsis queues on the interface: 7
Total DOCSIS Queues Allocated: 19
Available/Maximal reservable rate(kbps): 67503/67503

```

HQF BLT Info (LBLT Group 16):

```

LBLT 179: wt/qntm 1/4478; PBLT 3: BW 36000Kbps, flowbit prd/ofst 512/0, rsrc/fl
LBLT 180: wt/qntm 1/10000; PBLT 4: BW 37500Kbps, flowbit prd/ofst 512/4, rsrc/fl
LBLT 181: wt/qntm 1/4473; PBLT 5: BW 35625Kbps, flowbit prd/ofst 512/8, rsrc/fl

```

BE Queues:

```

Queue Index: 131347, GlobalQID 123, CBLT ID 131347
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 10000000, QLimit 255
Service Flow(s): rp_sf_index 32928, lc_sfid 8, min_rate(bps) 0, max_rate(bps) 10

Queue Index: 131353, GlobalQID 131, CBLT ID 131353
 MinRate(Kbps) 0, ExcessRatio 32, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32934, lc_sfid 18, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131354, GlobalQID 132, CBLT ID 131354
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32935, lc_sfid 23, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131355, GlobalQID 133, CBLT ID 131355
 MinRate(Kbps) 0, ExcessRatio 32, ShapeRate(bps) 0, QLimit 255

```

```

Service Flow(s): rp_sf_index 32936, lc_sf_id 20, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131356, GlobalQID 134, CBLT ID 131356
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32937, lc_sf_id 24, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131357, GlobalQID 135, CBLT ID 131357
 MinRate(Kbps) 0, ExcessRatio 32, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32938, lc_sf_id 26, min_rate(bps) 0, max_rate(bps) 0

Queue Index: 131358, GlobalQID 136, CBLT ID 131358
 MinRate(Kbps) 0, ExcessRatio 4, ShapeRate(bps) 0, QLimit 255
Service Flow(s): rp_sf_index 32939, lc_sf_id 27, min_rate(bps) 0, max_rate(bps) 0

CIR Queues:

LL Queues:

```

## Related Commands

| Command              | Description                                                                                    |
|----------------------|------------------------------------------------------------------------------------------------|
| <b>show cr10k-rp</b> | Displays packet processing information for a particular service ID (SID) on a cable interface. |

# show cr10k-rp slots



## Note

This command is meant for engineering debugging, and not for general customer use.

To display slot information for a particular service ID (SID) on a cable interface, use the **show cr10k-rp slots** command in user EXEC or privileged EXEC mode.

**show cr10k-rp slots**

## Syntax Description

This command has no keywords or arguments.

## Defaults

No default behavior or values.

## Command Modes

User EXEC (>)  
Privileged EXEC (#)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced for the Cisco uBR10012 router.      |
| 12.3BC      | This command was integrated into Cisco IOS release 12.3BC.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS release 12.2(33)SCA. |

## Usage Guidelines

The **show cr10k-rp slots** command displays information that the PRE remote processor (RP) module has about a particular SID. This information includes configuration information about the SID, as well as internal status information that is useful only to Cisco engineers in troubleshooting problems.

## Examples

The following example shows typical output for the **show cr10k-rp slots** command for a SID that identifies a cable modem:

Router# **show cr10k-rp slots**

| Slot/Sub | Flags  | (Address)    |
|----------|--------|--------------|
| 1/0      | 0x0804 | (0x6494E168) |
| 1/1      | 0x0804 | (0x6494E250) |
| 2/0      | 0x0002 | (0x6494E338) |
| 2/1      | 0x0002 | (0x6494E420) |
| 3/0      | 0x0002 | (0x6494E508) |
| 3/1      | 0x0002 | (0x6494E5F0) |
| 4/0      | 0x0804 | (0x6494E6D8) |
| 4/1      | 0x0804 | (0x6494E7C0) |
| 5/0      | 0x0804 | (0x6494E8A8) |
| 5/1      | 0x0002 | (0x6494E990) |
| 6/0      | 0x0002 | (0x6494EA78) |
| 6/1      | 0x0002 | (0x6494EB60) |



```

7/0 0x0804 (0x6494EC48)
7/1 0x0002 (0x6494ED30)
8/0 0x0002 (0x6494EE18)
8/1 0x0002 (0x6494EF00)

```

## OIR TABLE:

```

slot: 0 type: 00000001 bays: 0 analyzed: 1
slot: 1 type: 00000001 bays: 0 analyzed: 1
slot: 2 type: 00000415 bays: 4 analyzed: 1
 bay: 0 type: 000004AE
 bay: 1 type: 000004AE
 bay: 2 type: 00000000
 bay: 3 type: 00000000
slot: 3 type: 000005B0 bays: 0 analyzed: 1
slot: 4 type: 00000000 bays: 0 analyzed: 0
slot: 5 type: 000002AF bays: 0 analyzed: 1
slot: 6 type: 00000000 bays: 0 analyzed: 0
slot: 7 type: 00000000 bays: 0 analyzed: 0
slot: 8 type: 00000390 bays: 0 analyzed: 1
slot: 9 type: 00000390 bays: 0 analyzed: 1
slot: 10 type: 00000487 bays: 0 analyzed: 1
slot: 11 type: 00000000 bays: 0 analyzed: 0
slot: 12 type: 00000000 bays: 0 analyzed: 0
slot: 13 type: 00000000 bays: 0 analyzed: 0
slot: 14 type: 000003D5 bays: 0 analyzed: 1
slot: 15 type: 00000000 bays: 0 analyzed: 0
slot: 16 type: 00000000 bays: 0 analyzed: 0
slot: 17 type: 00000000 bays: 0 analyzed: 0

```

## SLOT INFO:

```

slot: 0 subslot: 0 index: 0 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 7178D9A0 ironbus i0
slot: 0 subslot: 1 index: 1 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F000 ironbus i0
slot: 1 subslot: 0 index: 2 num_bays: 4
double wide: 1 type: 00000415 util type: FFFFFFFF plugin: 72CB529C ironbus i1
 slot: 1 subslot: 0 index: 2 type: 000004AE
 slot: 1 subslot: 256 index: 2 type: 000004AE
 slot: 1 subslot: 512 index: 2 type: 00000000
 slot: 1 subslot: 768 index: 2 type: 00000000
slot: 1 subslot: 1 index: 3 num_bays: 0
double wide: 0 type: 000005B0 util type: FFFFFFFF plugin: 22900974 ironbus i1
slot: 2 subslot: 0 index: 4 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F120 ironbus i0
slot: 2 subslot: 1 index: 5 num_bays: 0
double wide: 0 type: 000002AF util type: FFFFFFFF plugin: 26362104 ironbus i0
slot: 3 subslot: 0 index: 6 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F1E0 ironbus i0
slot: 3 subslot: 1 index: 7 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F240 ironbus i0
slot: 4 subslot: 0 index: 8 num_bays: 0
double wide: 0 type: 00000390 util type: FFFFFFFF plugin: 263621A4 ironbus i0
slot: 4 subslot: 1 index: 9 num_bays: 0
double wide: 0 type: 00000390 util type: FFFFFFFF plugin: 761EF050 ironbus i1
slot: 5 subslot: 0 index: 10 num_bays: 0
double wide: 0 type: 00000487 util type: FFFFFFFF plugin: 76200EFC ironbus i0
slot: 5 subslot: 1 index: 11 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F3C0 ironbus i0
slot: 6 subslot: 0 index: 12 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F420 ironbus i0
slot: 6 subslot: 1 index: 13 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F480 ironbus i0
slot: 7 subslot: 0 index: 14 num_bays: 0
double wide: 0 type: 000003D5 util type: FFFFFFFF plugin: 22900FA0 ironbus i0
slot: 7 subslot: 1 index: 15 num_bays: 0

```

**show cr10k-rp slots**

```
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F540 ironbus i0
slot: 8 subslot: 0 index: 16 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F5A0 ironbus i0
slot: 8 subslot: 1 index: 17 num_bays: 0
double wide: 0 type: FFFFFFFF util type: FFFFFFFF plugin: 6494F600 ironbus i0
```

**Related Commands**

| Command                    | Description                                                         |
|----------------------------|---------------------------------------------------------------------|
| <b>show cr10k-rp queue</b> | Displays information about the packet queues for a cable interface. |

# show crypto ca certificates

To display all certificates (Root, Manufacturers, cable modem) that the CMTS has learned, use the **show crypto ca certificates** command in privileged EXEC mode.

**show crypto ca certificates**

**Syntax Description** No default behaviors or values

**Command Modes** Privileged EXEC

## Command History

| Release    | Modification                 |
|------------|------------------------------|
| 12.3(9a)BC | This command was introduced. |

## Usage Guidelines



### Note

You can use the unsupported command **test cable generate** in privileged EXEC mode to force the Cisco CMTS to register the root certificate.

For additional information about using the **show crypto** commands on the Cisco CMTS, refer to the “Configuring DOCSIS 1.1 on the Cisco CMTS” chapter of the *Cisco CMTS Feature Guide*:

## Examples

The following example illustrates the use of the show crypto ca certificates command:

```
Router# show crypto ca certificates
```

## Related Commands

| Command                           | Description                                                                                                                    |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>show crypto ca trustpoints</b> | Displays the Root certificate that the Cisco CMTS has learned after the first cable modem has registered with BPI+ encryption. |

# show crypto ca trustpoints

To display the Root certificate that the Cisco CMTS has learned after the first cable modem has registered with BPI+ encryption, use the **show crypto ca trustpoints** command in privileged EXEC mode.

**show crypto ca trustpoints**

**Syntax Description** No default behaviors or values

**Command Modes** Privileged EXEC

| Command History | Release    | Modification                 |
|-----------------|------------|------------------------------|
|                 | 12.3(9a)BC | This command was introduced. |

## Usage Guidelines



**Note**

The **show crypto ca trustpoints** command does not display the root certificate until after at least one cable modem has registered with the Cisco CMTS using BPI+ encryption. Alternatively, you can use the unsupported command **test cable generate** in privileged EXEC mode to force the Cisco CMTS to register the root certificate.



**Tip**

To display all certificates (Root, Manufacturers, CM) that the CMTS has learned, use the **show crypto ca certificates** command.

For additional information about using the **show crypto** commands on the Cisco CMTS, refer to the “Configuring DOCSIS 1.1 on the Cisco CMTS” chapter of the *Cisco CMTS Feature Guide*:

## Examples

The following example illustrates the **show crypto ca trustpoints** command with Cisco IOS Release 12.3(9a)BC:

```
Router# show crypto ca trustpoints

Root certificate
Status: Available
Certificate Serial Number: D54BB68FE934324F6B8FD0E41A65D867
Key Usage: General Purpose
Issuer:
CN = DOCSIS Cable Modem Root Certificate Authority
OU = Cable Modems
O = Data Over Cable Service Interface Specifications
C = US
Subject Name:
CN = "BPI Cable Modem Root Certificate Authority "
OU = DOCSIS
O = BPI
C = US
Validity Date:
start date: 07:00:00 UTC Mar 27 2001
end date: 06:59:59 UTC Jan 1 2007
```

**Related Commands**

| Command                            | Description                                                                                   |
|------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>show crypto ca certificates</b> | Displays all certificates (Root, Manufacturers, cable modem) that the Cisco CMTS has learned. |

■ show crypto ca trustpoints



## Cable Commands: show d through show i

Revised: August 12, 2013, OL-15510-17

### New Commands

| Command                                  | Cisco IOS Software Release |
|------------------------------------------|----------------------------|
| show hw-module bay transceiver           | 12.2(33)SCA                |
| show interface bundle multicast-sessions | 12.2(33)SCA                |
| show interface cable multicast-sessions  | 12.2(33)SCA                |
| show interface modular-cable             | 12.3(23)BC                 |
| show interface modular-cable accounting  | 12.3(23)BC                 |
| show interface modular-cable description | 12.3(23)BC                 |
| show interface modular-cable downstream  | 12.3(23)BC                 |
| show interface modular-cable intercept   | 12.3(23)BC                 |
| show interface modular-cable stats       | 12.3(23)BC                 |
| show interface modular-cable summary     | 12.3(23)BC                 |
| show interface modular-cable switching   | 12.3(23)BC                 |
| show interface rf-status                 | 12.2(33)SCB                |
| show ipdr collector                      | 12.2(33)SCB                |
| show ipdr exporter                       | 12.2(33)SCB                |
| show ipdr session                        | 12.2(33)SCB                |
| show ipdr session (collector)            | 12.2(33)SCB                |
| show ipdr session template               | 12.2(33)SCB                |
| show depi                                | 12.2(33)SCC                |
| show diagnostic bootup                   | 12.2(33)SCC                |
| show diagnostic content                  | 12.2(33)SCC                |
| show diagnostic ood-status               | 12.2(33)SCC                |



| Command                                         | Cisco IOS Software Release |
|-------------------------------------------------|----------------------------|
| show diagnostic result                          | 12.2(33)SCC                |
| show diagnostic schedule                        | 12.2(33)SCC                |
| show interface cable upstream debug             | 12.2(33)SCC                |
| show interface integrated-cable                 | 12.2(33)SCC                |
| show interface modular-cable dlm                | 12.2(33)SCC                |
| show interface multicast-gcr                    | 12.2(33)SCC                |
| show interface integrated-cable queue           | 12.2(33)SCD                |
| show interface wideband-cable queue             | 12.2(33)SCD                |
| show hccp linecard                              | 12.2(33)SCE                |
| show interface gigabitethernet                  | 12.2(33)SCE                |
| show interface cable dynamic-service statistics | 12.2(33)SCF                |
| show interface cable packetcable statistics     | 12.2(33)SCF                |
| show interface gigabitethernet                  | 12.2(33)SCF                |
| show interface wideband-cable queue             | 12.2(33)SCF                |
| show ip arp vrf                                 | 12.2(33)SCF                |
| show hccp channel-switch                        | 12.2(33)SCG                |

#### Modified Commands

| Command                                  | Cisco IOS Software Release |
|------------------------------------------|----------------------------|
| show hw-module bay                       | 12.3(23)BC                 |
| show interface cable modem               | 12.2(33)SCA                |
| show interface cable sid                 | 12.2(33)SCA, 12.3(23)BC2   |
| show interface cable upstream            | 12.3(23)BC2                |
| show hw-module all fpd                   | 12.2(33)SCB                |
| show hw-module bay                       | 12.2(33)SCB                |
| show hw-module bay oir                   | 12.2(33)SCB                |
| show hw-module subslot fpd               | 12.2(33)SCB                |
| show interface cable service-flow        | 12.2(33)SCB                |
| show interface cable upstream            | 12.2(33)SCB                |
| show interface modular-cable             | 12.2(33)SCB                |
| show interface modular-cable accounting  | 12.2(33)SCB                |
| show interface modular-cable description | 12.2(33)SCB                |
| show interface modular-cable downstream  | 12.2(33)SCB                |
| show interface modular-cable intercept   | 12.2(33)SCB                |
| show interface modular-cable stats       | 12.2(33)SCB                |
| show interface modular-cable summary     | 12.2(33)SCB                |



| Command                                            | Cisco IOS Software Release |
|----------------------------------------------------|----------------------------|
| show interface modular-cable switching             | 12.2(33)SCB                |
| show interface wideband-cable                      | 12.2(33)SCB                |
| show interface cable intercept                     | 12.3(23)BC6                |
| show interface cable dsg downstream                | 12.3(33)SCA                |
| show interface cable dsg downstream                | 12.3(33)SCB4               |
| show interface cable mac-scheduler                 | 12.3(33)SCC                |
| show interface cable service-flow                  | 12.2(33)SCC                |
| show interface cable upstream                      | 12.2(33)SCC                |
| show hccp                                          | 12.3(33)SCC                |
| show interface cable privacy                       | 12.2(33)SCD                |
| show interface cable service-flow                  | 12.2(33)SCD                |
| show interface rf-status                           | 12.2(33)SCD                |
| show interface wideband-cable                      | 12.2(33)SCD                |
| show interface cable mac-scheduler                 | 12.2(33)SCD2               |
| show interface cable upstream                      | 12.2(33)SCD2               |
| show interface cable dsg downstream tg             | 12.2(33)SCD5               |
| show depi                                          | 12.2(33)SCE                |
| show depi session                                  | 12.2(33)SCE                |
| show depi tunnel                                   | 12.2(33)SCE                |
| show hccp                                          | 12.2(33)SCE                |
| show hccp group                                    | 12.2(33)SCE                |
| show interface cable                               | 12.2(33)SCE                |
| show interface cable admission-control reservation | 12.2(33)SCE                |
| show interface cable cable-monitor                 | 12.2(33)SCE                |
| show interface cable downstream                    | 12.2(33)SCE                |
| show interface cable dsg downstream                | 12.2(33)SCE                |
| show interface cable dsg downstream tg             | 12.2(33)SCE                |
| show interface cable intercept                     | 12.2(33)SCE                |
| show interface cable mac-scheduler                 | 12.2(33)SCE                |
| show interface cable modem                         | 12.2(33)SCE                |
| show interface cable multicast-sessions            | 12.2(33)SCE                |
| show interface cable privacy                       | 12.2(33)SCE                |
| show interface cable qos paramset                  | 12.2(33)SCE                |
| show interface cable service-flow                  | 12.2(33)SCE                |
| show interface cable sid                           | 12.2(33)SCE                |
| show interface cable signal-quality                | 12.2(33)SCE                |
| show interface cable upstream                      | 12.2(33)SCE                |

| Command                                         | Cisco IOS Software Release |
|-------------------------------------------------|----------------------------|
| show interface cable upstream debug             | 12.2(33)SCE                |
| show interface cable upstream                   | 12.2(33)SCE5               |
| show hccp                                       | 12.2(33)SCF                |
| show interface cable multicast-session          | 12.2(33)SCF                |
| show interface cable qos paramset total         | 12.2(33)SCF                |
| show interface cable service-flow               | 12.2(33)SCF                |
| show interface integrated-cable                 | 12.2(33)SCF                |
| show interface modular-cable                    | 12.2(33)SCF                |
| show interface modular-cable multicast-session  | 12.2(33)SCF                |
| show interface wideband-cable                   | 12.2(33)SCF                |
| show interface wideband-cable multicast-session | 12.2(33)SCF                |
| show depi session                               | 12.2(33)SCG                |
| show interface cable dsg downstream             | 12.2(33)SCG                |
| show interface cable modem                      | 12.2(33)SCG                |
| show interface cable qos paramset               | 12.2(33)SCG                |
| show interface cable service-flow               | 12.2(33)SCG                |
| show interface cable upstream                   | 12.2(33)SCG                |
| show interface gigabitethernet                  | 12.2(33)SCG                |

#### Replaced Commands

| Command                      | Replacement Command                | Cisco IOS Software Release |
|------------------------------|------------------------------------|----------------------------|
| show interface cable monitor | show interface cable cable-monitor | 12.2(33)SCA                |

# show debug

To display current debugging information that includes PacketCable COPS messages on the Cisco CMTS, use the **show debug** command in privileged EXEC mode.

**show debug**

**Syntax Description** No additional keywords or arguments

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.3(13a)BC | This command was introduced. |

**Usage Guidelines** For additional information about this feature and related commands, refer to the following document on Cisco.com:

- *COPS Engine Operation on the Cisco CMTS*

**Examples** The following example illustrates the use of the show debug command in relation to the COPS Engine Operation feature on the Cisco CMTS.

```
Router# show debug
PacketCable Client:
 Pktcbl COPS msgs debugging is on
PacketCable specific:
 Debugging is on for Subscriber 68.1.2.4, Mask 255.255.255.255
SLOT 6/0: Nov 19 04:57:09.219: %UBR10000-5-UNREGSIDTIMEOUT: CMTS deleted unregistered
Cable Modem 0002.8a8c.8c1a
SLOT 6/0: Nov 19 04:57:12.279: %UBR10000-5-UNREGSIDTIMEOUT: CMTS deleted unregistered
Cable Modem 0002.8a8c.92ae
*Nov 19 04:57:19.751: PktCbl(cops): Received callback [code 2, handle: 0x63982B08] from
COPS engine
*Nov 19 04:57:19.751: PktCbl(cops): Received a COPS DEC message, flags is 0x1
*Nov 19 04:57:19.755: PktCbl(cops): Received callback [code 2, handle: 0x63982B08] from
COPS engine
*Nov 19 04:57:19.755: PktCbl(cops): Received a COPS DEC message, flags is 0x1
*Nov 19 04:57:19.755: PktCbl(cops): Received callback [code 2, handle: 0x63982B08] from
COPS engine
*Nov 19 04:57:19.755: PktCbl(cops): Received a COPS DEC message, flags is 0x1
*Nov 19 04:57:19.755: PktCbl(cops): Received callback [code 2, handle: 0x63982B08] from
COPS engine
*Nov 19 04:57:19.755: PktCbl(ndle: 0x63982B08] from COPS engine
```

| Related Commands | Command                               | Description                                                                                                                                                   |
|------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cops ip dscp</b>                   | Specifies the Common Open Policy Service (COPS) Differentiated Services Code Point (DSCP) markings for COPS messages that are transmitted by the Cisco router |
|                  | <b>cops listeners access-list</b>     | Configures access control lists (ACLs) for inbound connections to all COPS listener applications on the Cisco CMTS.                                           |
|                  | <b>cops tcp window-size</b>           | Overrides the default TCP receive window size that is used by COPS processes.                                                                                 |
|                  | <b>debug packetcable cops</b>         | Enables debugging processes for PacketCable with the COPS engine.                                                                                             |
|                  | <b>debug packetcable gate control</b> | Enables and displays debugging processes for PacketCable gate control.                                                                                        |
|                  | <b>debug packetcable subscriber</b>   | Enables and displays debugging processes for PacketCable subscribers.                                                                                         |
|                  | <b>show cops servers</b>              | Displays COPS server addresses, port, state, keepalives, and policy client information.                                                                       |
|                  | <b>show ip rsvp policy</b>            | Displays policy server addresses, ACL IDs, and client/server connection status.                                                                               |

# show depi

To display Downstream External PHY Interface (DEPI) tunnel and session information, use the **show depi** command in privileged EXEC mode.

**show depi**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

**Examples** The following example shows a sample output of the **show depi** command on a Cisco uBR10012 router:

Router# **show depi**

DEPI Tunnel and Session Information Total tunnels 3 sessions 12

| LocTunID  | RemTunID   | Remote Name | State | Remote Address | Sessn Count | L2TP Class |
|-----------|------------|-------------|-------|----------------|-------------|------------|
| 555844637 | 4037701912 | RFGW-10-1   | est   | 11.30.14.100   | 4           | test10     |

| LocID      | RemID      | TunID     | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|-----------|------|-------|----------|---------|------|
| 1252048235 | 1074332337 | 555844637 | 717, | est   | 1w0d     | 16      | P    |
| 1252049362 | 1074332330 | 555844637 | 711, | est   | 1w0d     | 15      | P    |
| 1252005266 | 1074332288 | 555844637 | 699, | est   | 1w0d     | 13      | P    |
| 1252000641 | 1074332316 | 555844637 | 705, | est   | 1w0d     | 14      | P    |

| LocTunID   | RemTunID   | Remote Name | State | Remote Address | Sessn Count | L2TP Class |
|------------|------------|-------------|-------|----------------|-------------|------------|
| 1486289361 | 1394811300 | RFGW-10-1   | est   | 12.30.14.100   | 4           | test10     |

| LocID      | RemID      | TunID      | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|------------|------|-------|----------|---------|------|
| 1252014460 | 1074332279 | 1486289361 | 549, | est   | 1w0d     | 20      | P    |
| 1252059306 | 1074332234 | 1486289361 | 531, | est   | 1w0d     | 17      | P    |
| 1252057709 | 1074332245 | 1486289361 | 537, | est   | 1w0d     | 18      | P    |
| 1252006708 | 1074332262 | 1486289361 | 543, | est   | 1w0d     | 19      | P    |

| LocTunID   | RemTunID   | Remote Name | State | Remote Address | Sessn Count | L2TP Class |
|------------|------------|-------------|-------|----------------|-------------|------------|
| 1688275168 | 1361251901 | RFGW-10-1   | est   | 24.30.14.100   | 4           | test10     |

| LocID      | RemID      | TunID      | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|------------|------|-------|----------|---------|------|
| 1252018493 | 1074332252 | 1688275168 | 537, | est   | 1w0d     | 22      | S    |
| 1252054974 | 1074332286 | 1688275168 | 549, | est   | 1w0d     | 24      | S    |
| 1252022230 | 1074332263 | 1688275168 | 543, | est   | 1w0d     | 23      | S    |
| 1252059782 | 1074332236 | 1688275168 | 531, | est   | 1w0d     | 21      | S    |

Table 196 describes the major fields shown in the **show depi** command display:

**Table 196** *show depi Field Descriptions*

| Field                 | Description                           |
|-----------------------|---------------------------------------|
| LocTunID              | Identifier of the local tunnel.       |
| RemTunID              | Identifier of the remote tunnel.      |
| Remote Name           | Name of the remote tunnel.            |
| State                 | State of the tunnel.                  |
| Remote Address        | IP address of the remote tunnel.      |
| Session Count         | Number of sessions.                   |
| L2TP Class/VPDN Group | L2TP class name for the tunnel.       |
| LocID                 | Identifier of the session.            |
| RemID                 | Identifier of the remote session.     |
| TunID                 | Identifier of the tunnel.             |
| State                 | State of the session.                 |
| Last Chg              | Last state change timestamp.          |
| Uniq ID               | Unique identifier of the QAM channel. |
| Type                  | Primary or secondary session.         |

#### Related Commands

| Command                         | Description                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>depi-tunnel</b>              | Creates a template of DEPI tunnel configuration settings that can be inherited by different pseudowire classes. |
| <b>rf-channel depi-tunnel</b>   | Binds the depi-tunnel to an rf-channel on a shared port adapter (SPA).                                          |
| <b>controller modular-cable</b> | Enters controller configuration mode to configure the SPA controller.                                           |
| <b>show depi session</b>        | Displays information about DEPI sessions.                                                                       |
| <b>show depi tunnel</b>         | Displays information about DEPI tunnels.                                                                        |

# show depi session

To display information about Downstream External PHY Interface (DEPI) sessions, use the **show depi session** command in privileged EXEC mode.

**show depi session** [*session-id* | **configured** | **name** *session-name* | **controller** **Modular-Cable** *slot/subslot/unit-number* | **interface** *interface-name* | **primary** | **secondary** | **tsid** *ts-id* | **endpoints**] [**verbose**]

| Syntax Description                                                           |                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>session-id</i>                                                            | (Optional) Local session ID value. The allowed range is from 1 to 4294967295.                                                                                                                                                                                                                                                                                                          |
| <b>verbose</b>                                                               | (Optional) Displays detailed DEPI session information.                                                                                                                                                                                                                                                                                                                                 |
| <b>configured</b>                                                            | (Optional) Displays all the DEPI sessions configured and their state. The states are IDLE and ACTIVE.                                                                                                                                                                                                                                                                                  |
| <b>name</b> <i>session-name</i>                                              | (Optional) Specifies the name of the DEPI session.                                                                                                                                                                                                                                                                                                                                     |
| <b>controller</b><br><b>modular-cable</b><br><i>slot/subslot/unit-number</i> | (Optional) Specifies the controller modular cable interface. <ul style="list-style-type: none"> <li><i>slot</i>—Controller modular cable interface slot. The valid range is from 0 to 8.</li> <li><i>subslot</i>—Controller modular cable interface subslot. The valid value is 0 or 1.</li> <li><i>unit-number</i>—Controller unit number. The valid range is from 0 to 2.</li> </ul> |
| <b>interface</b><br><i>interface-name</i>                                    | (Optional) Specifies the interface type.                                                                                                                                                                                                                                                                                                                                               |
| <b>primary</b>                                                               | (Optional) Specifies the primary DEPI session.                                                                                                                                                                                                                                                                                                                                         |
| <b>secondary</b>                                                             | (Optional) Specifies the backup DEPI session.                                                                                                                                                                                                                                                                                                                                          |
| <b>tsid</b> <i>ts-id</i>                                                     | (Optional) Specifies the Transport Stream Identifier (TSID).                                                                                                                                                                                                                                                                                                                           |
| <b>endpoints</b>                                                             | (Optional) Specifies DEPI session endpoints including tunnel ID and Edge Quadrature Amplitude Modulation (EQAM) RF port.                                                                                                                                                                                                                                                               |

**Command Default** None

**Command Modes** Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                                                                  |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced.                                                                                                                                                                                                                                                                                                  |
| 12.2(33)SCE | This command was modified. The following keywords were added to this command: <ul style="list-style-type: none"> <li>• <b>primary</b></li> <li>• <b>secondary</b></li> <li>• <b>tsid</b></li> <li>• <b>name</b></li> <li>• <b>controller Modular-Cable</b></li> <li>• <b>interface</b></li> <li>• <b>endpoints</b></li> </ul> |
| 12.2(33)SCG | This command was modified to support verbose output with the <b>tsid</b> option.                                                                                                                                                                                                                                              |

**Examples**

The following is a sample output of the **show depi session** command for all the established DEPI data sessions:

```
Router# show depi session
```

| LocID      | RemID      | TunID      | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|------------|------|-------|----------|---------|------|
| 1252048235 | 1074332337 | 555844637  | 717, | est   | 3d09h    | 16      | P    |
| 1252049362 | 1074332330 | 555844637  | 711, | est   | 3d09h    | 15      | P    |
| 1252005266 | 1074332288 | 555844637  | 699, | est   | 3d09h    | 13      | P    |
| 1252000641 | 1074332316 | 555844637  | 705, | est   | 3d09h    | 14      | P    |
| 1252014460 | 1074332279 | 1486289361 | 549, | est   | 3d09h    | 20      | P    |
| 1252059306 | 1074332234 | 1486289361 | 531, | est   | 3d09h    | 17      | P    |
| 1252057709 | 1074332245 | 1486289361 | 537, | est   | 3d09h    | 18      | P    |
| 1252006708 | 1074332262 | 1486289361 | 543, | est   | 3d09h    | 19      | P    |
| 1252018493 | 1074332252 | 1688275168 | 537, | est   | 3d09h    | 22      | S    |
| 1252054974 | 1074332286 | 1688275168 | 549, | est   | 3d09h    | 24      | S    |
| 1252022230 | 1074332263 | 1688275168 | 543, | est   | 3d09h    | 23      | S    |
| 1252059782 | 1074332236 | 1688275168 | 531, | est   | 3d09h    | 21      | S    |

The following is a sample output of the **show depi session** command for a specific DEPI data session identified by the session ID in Cisco IOS Release 12.2(33)SCC:

```
Router# show depi session 1252018468 verbose
```

```
Session id 1252018468 is up, tunnel id 1834727012
 Remote session id is 1252055513, remote tunnel id 3849925733
 Locally initiated session
Qam Channel Parameters
 Group Tsid is 0
 Frequency is 717000000
 Modulation is 64qam
 Annex is B
 Interleaver Depth I=32 J=4
 Power is 0
 Qam channel status is 0
 Unique ID is 1
Call serial number is 326100007
Remote tunnel name is RFGW-10
 Internet address is 1.3.4.155
Local tunnel name is myankows_ubr10k
 Internet address is 1.3.4.103
```



```

IP protocol 115
 Session is L2TP signaled
 Session state is established, time since change 04:06:24
 0 Packets sent, 0 received
 0 Bytes sent, 0 received
 Last clearing of counters never
 Counters, ignoring last clear:
 0 Packets sent, 0 received
 0 Bytes sent, 0 received
 Receive packets dropped:
 out-of-order: 0
 total: 0
 Send packets dropped:
 exceeded session MTU: 0
 total: 0
 DF bit on, ToS reflect enabled, ToS value 0, TTL value 255
 UDP checksums are disabled
 Session PMTU enabled, path MTU is 1492 bytes
 No session cookie information available
 FS cached header information:
 encap size = 28 bytes
 45000014 00004000 FF73706F 01030467
 0103049B 4AA0D9D9 00000000
 Sequencing is on
 Ns 0, Nr 0, 0 out of order packets received
 Packets switched/dropped by secondary path: Tx 0, Rx 0
 Conditional debugging is disabled

```

The following is a sample output of the **show depi session** command that displays EQAM statistics for a specific DEPI data session identified by the session ID in Cisco IOS Release 12.2(33)SCE:

Router# **show depi session 1252063105 verbose**

```

Session id 1252063105 is up, tunnel id 1867895303
 Remote session id is 1074332253, remote tunnel id 3468518668
 Locally initiated session
 Session Type: Primary
Qam Channel Parameters
 Tsid is 537
 Group Tsid is 57
 Frequency is 537000000
 Modulation is 256qam
 Annex is B
 Interleaver Depth I=32 J=4
 Power is 530
 Qam channel status is 0
 Unique ID is 30
Call serial number is 2801814825
Remote tunnel name is RFGW-10-1
 Internet address is 12.30.14.100
Local tunnel name is prasm_ubr10k
 Internet address is 12.30.14.200
IP protocol 115
 Session is L2TP signaled
 Session state is established, time since change 5d12h
 0 Packets sent, 0 received
 0 Bytes sent, 0 received
 Last clearing of counters never
 Counters, ignoring last clear:
 0 Packets sent, 0 received
 0 Bytes sent, 0 received
 Receive packets dropped:
 out-of-order: 0
 total: 0

```

**show depi session**

```

Send packets dropped:
 exceeded session MTU: 0
 total: 0
DF bit on, ToS reflect enabled, ToS value 0, TTL value 255
UDP checksums are disabled
Session PMTU enabled, path MTU is 1492 bytes
No session cookie information available
FS cached header information:
 encap size = 28 bytes
 45000014 00004000 FF73460F 0C1E0EC8
 0C1E0E64 4009025D 00000000
Sequencing is on
 Ns 0, Nr 0, 0 out of order packets received
 Packets switched/dropped by secondary path: Tx 0, Rx 0

Peer Session Details
 Peer Session ID : 1074332253
 Peer Qam ID : Qam7/10.2
 Peer Qam State : ACTIVE
 Peer Qam Type : Primary

Peer Qam Statistics
 Total Pkts : 270971
 Total Octets : 50942548
 Total Discards : 0
 Total Errors : 0
 Total In Pkt Rate : 0
 Bad Sequence Num : 0
 Total In DLM Pkts : 0
 Conditional debugging is disabled

```

The following is a sample output of the **show depi session** command for all the configured DEPI data sessions:

Router# **show depi session configured**

```

Load for five secs: 2%/0%; one minute: 2%; five minutes: 2%
Time source is hardware calendar, *17:10:12.309 UTC Sun Jul 4 2010

Session Name State Reason Time
Modular-Cable5/0/0:0 ACTIVE -
Modular-Cable5/0/0:1 ACTIVE -
Modular-Cable5/0/0:2 ACTIVE -
Modular-Cable5/0/0:3 ACTIVE -
Modular-Cable5/0/1:0 ACTIVE -
Modular-Cable5/0/1:5/1/1:0 ACTIVE -
Modular-Cable5/0/1:1 ACTIVE -
Modular-Cable5/0/1:5/1/1:1 ACTIVE -
Modular-Cable5/0/1:2 ACTIVE -
Modular-Cable5/0/1:5/1/1:2 ACTIVE -
Modular-Cable5/0/1:3 ACTIVE -
Modular-Cable5/0/1:5/1/1:3 ACTIVE -

```

The following is a sample output of the **show depi session** command that displays all primary data sessions on the Cisco uBR10012 router:

Router# **show depi session primary**

```

Load for five secs: 5%/0%; one minute: 2%; five minutes: 2%
Time source is hardware calendar, *17:13:10.389 UTC Sun Jul 4 2010

LocID RemID TunID Tsid State Last Chg Uniq ID Type
1252048235 1074332337 555844637 717, est 3d09h 16 P
1252049362 1074332330 555844637 711, est 3d09h 15 P
1252005266 1074332288 555844637 699, est 3d09h 13 P

```

```

1252000641 1074332316 555844637 705, est 3d09h 14 P
1252014460 1074332279 1486289361 549, est 3d09h 20 P
1252059306 1074332234 1486289361 531, est 3d09h 17 P
1252057709 1074332245 1486289361 537, est 3d09h 18 P
1252006708 1074332262 1486289361 543, est 3d09h 19 P

```

The following is a sample output of the **show depi session** command that displays all secondary data sessions on the Cisco uBR10012 router:

Router# **show depi session secondary**

```

Load for five secs: 0%/0%; one minute: 2%; five minutes: 2%
Time source is hardware calendar, *17:13:56.777 UTC Sun Jul 4 2010

```

| LocID      | RemID      | TunID      | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|------------|------|-------|----------|---------|------|
| 1252018493 | 1074332252 | 1688275168 | 537, | est   | 3d09h    | 22      | S    |
| 1252054974 | 1074332286 | 1688275168 | 549, | est   | 3d09h    | 24      | S    |
| 1252022230 | 1074332263 | 1688275168 | 543, | est   | 3d09h    | 23      | S    |
| 1252059782 | 1074332236 | 1688275168 | 531, | est   | 3d09h    | 21      | S    |

The following is a sample output of the **show depi session** command that shows details of a particular session identified by the session name:

Router# **show depi session name Modular-Cable5/0/0:0**

```

Load for five secs: 1%/0%; one minute: 2%; five minutes: 2%
Time source is hardware calendar, *17:12:43.281 UTC Sun Jul 4 2010

```

| LocID      | RemID      | TunID     | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|-----------|------|-------|----------|---------|------|
| 1252005266 | 1074332288 | 555844637 | 699, | est   | 3d09h    | 13      | P    |

The following is a sample output of the **show depi session** command that shows all secondary data sessions on the Cisco uBR10012 router:

Router# **show depi session tsid 537**

```

Load for five secs: 1%/0%; one minute: 2%; five minutes: 2%
Time source is hardware calendar, *17:14:29.465 UTC Sun Jul 4 2010

```

| LocID      | RemID      | TunID      | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|------------|------|-------|----------|---------|------|
| 1252057709 | 1074332245 | 1486289361 | 537, | est   | 3d09h    | 18      | P    |

  

| LocID      | RemID      | TunID      | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|------------|------|-------|----------|---------|------|
| 1252018493 | 1074332252 | 1688275168 | 537, | est   | 3d09h    | 22      | S    |

The following is a sample output of the **show depi session** command that shows DEPI session endpoints in Cisco IOS Release 12.2(33)SCE and later:

Router# **show depi session endpoints**

| DEPI Tunnel               | RF Channel       | EQAM rf-port | Tsid  | State | Type |
|---------------------------|------------------|--------------|-------|-------|------|
| depi_working_tunnel_8_0_0 | Mod8/0/0:0       | Qam3/7.1     | 371   | est   | P    |
| depi_protect_tunnel_5_1_0 | Mod8/0/0:5/1/0:0 | Qam3/7.1     | 371   | est   | S    |
| non_cisco_eqam_tunnel     | Mod8/0/0:6       | -            | 11012 | est   | P    |

The following is a sample output of the **show depi session** command with the **verbose** keyword in Cisco IOS Release 12.2(33)SCG:

Router# **show depi session tsid 531 verbose**

Load for five secs: 1%/0%; one minute: 2%; five minutes: 2%  
Time source is hardware calendar, \*10:10:34.349 UTC Thu Aug 18 2011

| LocID      | RemID      | TunID      | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|------------|------|-------|----------|---------|------|
| 1252004030 | 1074332230 | 4168849253 | 531  | est   | 1d02h    | 9       | P    |

Session id 1252004030 is up, tunnel id 4168849253  
Remote session id is 1074332230, remote tunnel id 1302274286  
Locally initiated session  
Session Type: Primary

#### Qam Channel Parameters

Tsid is 531  
Group Tsid is 57  
Frequency is 531000000  
Modulation is 256qam  
Annex is B  
Interleaver Depth I=32 J=4  
Power is 530  
Qam channel status is 0  
Unique ID is 9

Call serial number is 3208000008

Remote tunnel name is RFGW-10-1

Internet address is 12.30.14.100

Local tunnel name is prasm\_ubr10k

Internet address is 12.30.14.200

IP protocol 115

Session is L2TP signaled  
Session state is established, time since change 1d02h

0 Packets sent, 0 received

0 Bytes sent, 0 received

Last clearing of counters never

Counters, ignoring last clear:

0 Packets sent, 0 received

0 Bytes sent, 0 received

Receive packets dropped:

out-of-order: 0

total: 0

Send packets dropped:

exceeded session MTU: 0

total: 0

DF bit on, ToS reflect enabled, ToS value 0, TTL value 255

UDP checksums are disabled

Session PMTU enabled, path MTU is 1492 bytes

No session cookie information available

FS cached header information:

encap size = 28 bytes

45000014 00004000 FF73460F 0C1E0EC8

0C1E0E64 40090246 00000000

Sequencing is on

Ns 0, Nr 0, 0 out of order packets received

Packets switched/dropped by secondary path: Tx 0, Rx 0

#### Peer Session Details

Peer Session ID : 1074332230

Peer Qam ID : Qam7/10.1

Peer Qam State : ACTIVE

Peer Qam Type : Primary

#### Peer Qam Statistics

Total Pkts : 104055078

```

Total Octets : 19562354664
Total Discards : 0
Total Errors : 0
Total In Pkt Rate : 1068
Bad Sequence Num : 0
Total In DLM Pkts : 0
Conditional debugging is disabled

```

| LocID      | RemID      | TunID     | Tsid | State | Last Chg | Uniq ID | Type |
|------------|------------|-----------|------|-------|----------|---------|------|
| 1252046589 | 1074332227 | 501350688 | 531  | est   | 1d02h    | 13      | S    |

```

Session id 1252046589 is up, tunnel id 501350688
Remote session id is 1074332227, remote tunnel id 4220074353
Locally initiated session
Session Type: Secondary
Qam Channel Parameters
Tsid is 531
Group Tsid is 57
Frequency is 531000000
Modulation is 256qam
Annex is B
Interleaver Depth I=32 J=4
Power is 530
Qam channel status is 0
Unique ID is 13
Call serial number is 3208000004
Remote tunnel name is RFGW-10-1
Internet address is 24.30.14.100
Local tunnel name is prasm_ubr10k
Internet address is 24.30.14.200
IP protocol 115
Session is L2TP signaled
Session state is established, time since change 1d02h
0 Packets sent, 0 received
0 Bytes sent, 0 received
Last clearing of counters never
Counters, ignoring last clear:
0 Packets sent, 0 received
0 Bytes sent, 0 received
Receive packets dropped:
out-of-order: 0
total: 0
Send packets dropped:
exceeded session MTU: 0
total: 0
DF bit on, ToS reflect enabled, ToS value 0, TTL value 255
UDP checksums are disabled
Session PMTU enabled, path MTU is 1492 bytes
No session cookie information available
FS cached header information:
encap size = 28 bytes
45000014 00004000 FF732E0F 181E0EC8
181E0E64 40090243 00000000
Sequencing is on
Ns 0, Nr 0, 0 out of order packets received
Packets switched/dropped by secondary path: Tx 0, Rx 0

```

```

Peer Session Details
Peer Session ID : 1074332227
Peer Qam ID : Qam7/10.1
Peer Qam State : ACTIVE
Peer Qam Type : Secondary
Peer Qam Statistics
Total Pkts : 0

```

## ■ show depi session

```

Total Octets : 0
Total Discards : 0
Total Errors : 0
Total In Pkt Rate : 8409
Bad Sequence Num : 0
Total In DLM Pkts : 0
Conditional debugging is disabled

```

Table 196 describes the major fields shown in the **show depi session** command display.

**Table 197** *show depi Field Descriptions*

| Field        | Description                                 |
|--------------|---------------------------------------------|
| LocID        | Identifier of the session.                  |
| RemID        | Identifier of the remote session.           |
| TunID        | Identifier of the tunnel.                   |
| Tsid         | Transport Stream Identifier.                |
| State        | State of the session.                       |
| Last Chg     | Last state change timestamp.                |
| Uniq ID      | Unique identifier of the QAM channel.       |
| Type         | Primary or secondary session.               |
| RF Channel   | RF channel interface.                       |
| EQAM rf-port | The EQAM RF port used for the DEPI session. |

## ■ Related Commands

| Command                         | Description                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>depi-tunnel</b>              | Creates a template of DEPI tunnel configuration settings that can be inherited by different pseudowire classes. |
| <b>rf-channel depi-tunnel</b>   | Binds the DEPI tunnel to an RF channel on a shared port adapter (SPA).                                          |
| <b>controller modular-cable</b> | Enters controller configuration mode to configure the SPA controller.                                           |
| <b>show depi</b>                | Displays information about DEPI sessions and tunnels.                                                           |
| <b>show depi tunnel</b>         | Displays information about DEPI tunnels.                                                                        |

# show depi tunnel

To display information about Downstream External PHY Interface (DEPI) tunnels, use the **show depi tunnel** command in privileged EXEC mode.

**show depi tunnel** [*tunnel-id* **verbose** | **endpoints**]

|                           |                  |                                                                                                                         |
|---------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>tunnel-id</i> | (Optional) Name of the DEPI tunnel.                                                                                     |
|                           | <b>verbose</b>   | (Optional) Displays detailed DEPI tunnel or session information.                                                        |
|                           | <b>endpoints</b> | (Optional) Specifies DEPI tunnel endpoints including tunnel ID and Edge Quadrature Amplitude Modulation (EQAM) RF port. |

**Command Default** None

**Command Modes** Privileged EXEC (#)

|                        |                |                                                                                                                                 |
|------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                             |
|                        | 12.2(33)SCC    | This command was introduced.                                                                                                    |
|                        | 12.2(33)SCE    | This command was modified. Support for a new keyword, <b>endpoints</b> , was added to provide DEPI tunnel endpoint information. |

## Examples

The following example shows a sample output of the **show depi tunnel** command for all the active control connections:

```
Router# show depi tunnel
```

| LocTunID   | RemTunID   | Remote Name | State | Remote Address | Sessn Count | L2TP Class |
|------------|------------|-------------|-------|----------------|-------------|------------|
| 555844637  | 4037701912 | RFGW-10-1   | est   | 11.30.14.100   | 4           | test10     |
| 1486289361 | 1394811300 | RFGW-10-1   | est   | 12.30.14.100   | 4           | test10     |
| 1688275168 | 1361251901 | RFGW-10-1   | est   | 24.30.14.100   | 4           | test10     |

The following example shows a sample output of the **show depi tunnel** command for a specific active control connection identified by the DEPI tunnel name:

```
Router# show depi tunnel 1834727012 verbose
```

```
Tunnel id 1834727012 is up, remote id is 3849925733, 1 active sessions
 Locally initiated tunnel
 Tunnel state is established, time since change 04:10:38
 Remote tunnel name is RFGW-10
 Internet Address 1.3.4.155, port 0
 Local tunnel name is myankows_ubr10k
 Internet Address 1.3.4.103, port 0
 L2TP class for tunnel is rf6
 Counters, taking last clear into account:
 0 packets sent, 0 received
 0 bytes sent, 0 received
```

**show depi tunnel**

```

 Last clearing of counters never
 Counters, ignoring last clear:
 0 packets sent, 0 received
 0 bytes sent, 0 received
 Control Ns 255, Nr 254
 Local RWS 1024 (default), Remote RWS 8192
 Control channel Congestion Control is enabled
 Congestion Window size, Cwnd 256
 Slow Start threshold, Ssthresh 8192
 Mode of operation is Slow Start
 Retransmission time 1, max 1 seconds
 Unsent queuesize 0, max 0
 Resend queuesize 0, max 2
 Total resends 0, ZLB ACKs sent 252
 Total peer authentication failures 0
 Current no session pak queue check 0 of 5
 Retransmit time distribution: 0 0 0 0 0 0 0 0
 Control message authentication is disabled

```

The following is a sample output of the **show depi tunnel** command that shows DEPI tunnel endpoints in Cisco IOS Release 12.2(33)SCE and later:

Router# **show depi tunnel endpoints**

| DEPI Tunnel               | Modular Controller | State | Remote Address | Sessn<br>Count |
|---------------------------|--------------------|-------|----------------|----------------|
| depi_working_tunnel_8_0_4 | Mod8/0/2           | est   | 1.30.84.100    | 24             |
| depi_protect_tunnel_5_1_0 | Mod8/0/0:5/1/0     | est   | 1.30.50.100    | 24             |
| depi_protect_tunnel_5_1_4 | Mod8/0/2:5/1/2     | est   | 1.30.54.100    | 24             |
| depi_working_tunnel_8_0_0 | Mod8/0/0           | est   | 1.30.3.100     | 24             |

[Table 196](#) describes the major fields shown in the **show depi tunnel** command display:

**Table 198** *show depi Field Descriptions*

| Field              | Description                                                                |
|--------------------|----------------------------------------------------------------------------|
| LocTunID           | Identifier of the local tunnel.                                            |
| RemTunID           | Identifier of the remote tunnel.                                           |
| Remote Name        | Name of the remote tunnel.                                                 |
| State              | State of the tunnel.                                                       |
| Remote Address     | IP address of the remote tunnel.                                           |
| Session Count      | Number of sessions.                                                        |
| L2TP Class         | L2TP class name for the tunnel.                                            |
| Modular Controller | Controller modular cable interface for primary and secondary DEPI tunnels. |

**Related Commands**

| Command                         | Description                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>depi-tunnel</b>              | Creates a template of DEPI tunnel configuration settings that can be inherited by different pseudowire classes. |
| <b>rf-channel depi-tunnel</b>   | Binds the depi-tunnel to an rf-channel on a shared port adapter (SPA).                                          |
| <b>controller modular-cable</b> | Enters controller configuration mode to configure the SPA controller.                                           |



| Command           | Description                                           |
|-------------------|-------------------------------------------------------|
| show depi         | Displays information about DEPI sessions and tunnels. |
| show depi session | Displays information about DEPI sessions.             |

# show dhcp

To display the current Dynamic Host Configuration Protocol (DHCP) settings on point-to-point interfaces, use the **show dhcp** command in privileged EXEC mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show dhcp {lease | server}**

## Syntax Description

|               |                                               |
|---------------|-----------------------------------------------|
| <b>lease</b>  | Displays DHCP addresses leased from a server. |
| <b>server</b> | Displays known DHCP servers.                  |

## Command Modes

Privileged EXEC

## Command History

| Release    | Modification                                                          |
|------------|-----------------------------------------------------------------------|
| 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router. |
| 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.           |
| 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.           |
| 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
| 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.           |

## Usage Guidelines

You can use this command on any point-to-point type of interface that uses DHCP for temporary IP address allocation.

## Examples

The following is typical output from the **show dhcp lease** command:

```
Router# show dhcp lease
```

```
Temp IP addr: 188.188.1.40 for peer on Interface: cable-modem0
Temp sub net mask: 0.0.0.0
 DHCP Lease server: 4.0.0.32, state: 3 Bound
 DHCP transaction id: 2431
 Lease: 3600 secs, Renewal: 1800 secs, Rebind: 3150 secs
Temp default-gateway addr: 188.188.1.1
 Next timer fires after: 00:58:01
 Retry count: 0 Client-ID: 0010.7b43.aa01
Router#
```

[Table 0-199](#) describes the fields shown in the display.

**Table 0-199 show dhcp lease Field Descriptions**

| Field            | Description                                                     |
|------------------|-----------------------------------------------------------------|
| Temp IP addr     | IP address leased from the DHCP server for the cable interface. |
| Temp subnet mask | Temporary subnet mask assigned to the cable interface.          |

**Table 0-199** *show dhcp lease Field Descriptions (continued)*

| Field                     | Description                                                                                                                                                                                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DHCP Lease server         | IP address of the DHCP server that assigned an IP address to this client.                                                                                                                                                                                                                            |
| state                     | Current state of this client (the cable interface). Possible states are Bound, Renew, or Rebinding. For descriptions of these states, see RFC 2131.                                                                                                                                                  |
| DHCP transaction id       | Unique number established by the router before the first request message is sent to the DHCP server. The same transaction ID is used as long as the lease keeps getting renewed and is valid. If a new “discover” message is sent, a new transaction ID is used.                                     |
| Lease                     | Time (in seconds) for which the leased IP address is valid; the duration of the lease.                                                                                                                                                                                                               |
| Renewal                   | Time interval (in seconds) from address assignment until the client transitions to the renewing state. When the renewal (T1) time expires, the client sends a unicast dhcprequest message to the server to extend its lease. The default value of this timer is 0.5 times the duration of the lease. |
| Rebind                    | Time interval (in seconds) from address assignment until the client transitions to the rebinding state and sends a broadcast dhcprequest message to any DHCP server to extend its lease. The default value of this timer (T2) is 0.875 times the duration of the lease.                              |
| Temp default-gateway addr | IP address of the router closest to this client on the network.                                                                                                                                                                                                                                      |
| Next timer fires after    | Time in hours, minutes, and seconds until the next timer expires.                                                                                                                                                                                                                                    |
| Retry count               | Number of times the client has sent any message to the DHCP server—most likely a request message to extend its lease. When the lease is renewed, the Retry count is reset to 0.                                                                                                                      |
| Client-ID                 | MAC address (with optional media type code) that uniquely identifies the client on the subnet for binding lookups.                                                                                                                                                                                   |

The following example shows typical output for the **show dhcp server** command:

```
Router# show dhcp server

DHCP server: ANY (255.255.255.255)
Leases: 1
Offers: 1 Requests: 2 Acks: 1 Naks: 0
Declines: 0 Releases: 0 Bad: 0
TFTP Server Name: SOHOSERVER
TIME0: 1.2.0.250, TIME1: 0.0.0.0
Subnet: 255.255.255.0
Router#
```

Table 0-200 describes the fields shown in the display.

**Table 0-200** *show dhcp server Field Descriptions*

| Field       | Description                                                                |
|-------------|----------------------------------------------------------------------------|
| DHCP server | MAC address used by the DHCP server.                                       |
| Leases      | Number of current leased IP addresses.                                     |
| Offers      | Number of offers for an IP address sent to a proxy client from the server. |

**Table 0-200** *show dhcp server Field Descriptions (continued)*

| Field            | Description                                                                            |
|------------------|----------------------------------------------------------------------------------------|
| Requests         | Number of requests for an IP address to the server.                                    |
| Acks             | Number of acknowledge messages sent by the server to the proxy client.                 |
| Naks             | Number of not acknowledge messages sent by the server to the proxy client.             |
| Declines         | Number of offers from the server that have been declined by the proxy client.          |
| Releases         | Number of times IP addresses have been relinquished gracefully by the client.          |
| Bad              | Number of bad packets received due to wrong length, wrong field type, or other causes. |
| TFTP Server Name | Name (if any) configured for the server providing TFTP downloads to the CM.            |
| TIME0            | IP address of the primary Time-of-Day (ToD) server.                                    |
| TIME1            | IP address of the secondary ToD server.                                                |
| Subnet           | Subnet containing the DHCP server.                                                     |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                             | Description                                                                        |
|-------------------------------------|------------------------------------------------------------------------------------|
| <b>cable-modem voip best-effort</b> | Allows voice calls to be sent upstream over the cable interface using best effort. |
| <b>show bridge cable-modem</b>      | Displays bridging information for the cable interface.                             |
| <b>show interfaces cable-modem</b>  | Displays information about the cable interface.                                    |

# show diagnostic bootup

To display the currently configured diagnostics level at bootup, use the **show diagnostic bootup** command in user EXEC or privileged EXEC mode.

## show diagnostic bootup

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                                      |
|----------------------|--------------------------------------|
| <b>Command Modes</b> | User EXEC (>)<br>Privileged EXEC (#) |
|----------------------|--------------------------------------|

| Command History | Release     | Modification                                                                                                                                         |
|-----------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCC | The command was introduced in this release to support Generic Online Diagnostics (GOLD) functionality for Cisco uBR10012 Universal Broadband Router. |

|                         |                                                                                                                                                                                                                                                                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The level of diagnostic tests which run at bootup can be either configured as complete or minimal. To configure the bootup level, use the <b>diagnostic bootup level</b> command in global configuration mode. The <b>show diagnostic bootup level</b> command is used to display the currently configured bootup diagnostic level. |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                              |
|-----------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows a sample output of the <b>show diagnostic bootup level</b> command on the Cisco uBR10012 Router: |
|-----------------|------------------------------------------------------------------------------------------------------------------------------|

```
Router# show diagnostic bootup level
Current bootup diagnostic level: complete
```

| Related Commands | Command                 | Description                                                   |
|------------------|-------------------------|---------------------------------------------------------------|
|                  | diagnostic bootup level | Configures the level of diagnostic tests which run at bootup. |

# show diagnostic content

To display information about available tests, including test ID, test attributes, test schedule, and supported coverage test levels for each test and for each of the bays and line-cards, use the **show diagnostic content** command in user EXEC or privileged EXEC mode.

**show diagnostic content** [**all** | **bay** *slot/bay* | **slot** *slot-no* | **subslot** *slot/subslot*]

| Syntax Description                 |  |                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>                         |  | Displays information about available tests for all modules.                                                                                                                                                                                                                                                          |
| <b>bay</b> <i>slot/bay</i>         |  | Indicates the card slot and bay number of the SPA for which the available test content details is displayed. The <b>bay</b> keyword is used to refer a SPA on the router. The valid range for the slot number is from 1 to 8 and 0 to 3 for the bay number.                                                          |
| <b>slot</b> <i>slot-no</i>         |  | Indicates the slot number of the full-height line card for which the available test content details is displayed. The <b>slot</b> keyword is used to refer a full-height line card on the router. The valid range for slot is 1 to 8.                                                                                |
| <b>subslot</b> <i>slot/subslot</i> |  | Indicates the slot and subslot number of half-height line card for which the available test content details has to be displayed. The <b>subslot</b> keyword is used to refer a half-height line card on Cisco uBR10012 Router. The valid range for the slot number is from 1 to 8 and 0 to 1 for the subslot number. |

**Command Default**      None

**Command Modes**      User EXEC (>)  
Privileged EXEC (#)

| Command History | Release     | Modification                                               |
|-----------------|-------------|------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced for the Cisco uBR10012 Router. |

**Usage Guidelines**      For each available diagnostic test, a set of attributes is displayed as a series of characters in the Attributes field of the command output. An asterisk (\*) in the character location indicates that the attribute is not applicable to the test. The following set of attributes is displayed:

| Attribute | Description                                                                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------|
| M         | Test runs when the bootup diagnostic level is set to either Minimal or Complete.                                     |
| C         | Test runs when the bootup diagnostic level is set to Complete.                                                       |
| B         | Test runs when the <b>diagnostic ondemand</b> command is executed. Indicates that the test is a basic ondemand test. |
| P         | Test runs on a port, not the entire device (per-port test).                                                          |

| Attribute | Description                                                                                                                                                                                                   |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V         | Test runs on the entire device (per-device test).                                                                                                                                                             |
| D         | Test disrupts the network traffic (disruptive test).                                                                                                                                                          |
| N         | Test runs when the system is online without disrupting the network traffic (non disruptive test).                                                                                                             |
| S         | If the card under test is a standby card, only the standby card runs the test. The test does not run from the active card. If the card under test is an active card, the active card runs the test on itself. |
| X         | Test is not a health-monitoring test.                                                                                                                                                                         |
| F         | Monitoring interval of the test cannot be modified by the user (fixed monitoring test).                                                                                                                       |
| E         | User cannot disable the test (always enabled test).                                                                                                                                                           |
| A         | Monitoring is active for this test.                                                                                                                                                                           |
| I         | Monitoring is inactive for this test.                                                                                                                                                                         |

If a test is configured to run periodically, the interval will be displayed in the Test Interval field of the command output in the format dd hh:mm:ss.ms, indicating days, hours, minutes, seconds, and milliseconds. For example, the test interval of a test that runs every 15 minutes will be displayed as 000 00:15:00.00. The test interval of a test that runs every 14 days will be displayed as 014 00:00:00.00.

## Examples

This example shows a sample output of the **show diagnostic content bay 1/0** command that displays the test suite, monitoring interval, and test attributes for bay 1/0 on the Cisco uBR10012 Universal Broadband Router.

```
Router# show diagnostic content bay 1/0
```

```
Bay 1/0: 2jacket-1
```

```
Diagnostics test suite attributes:
```

```

M/C/* - Minimal bootup level test / Complete bootup level test / NA
B/* - Basic ondemand test / NA
P/V/* - Per port test / Per device test / NA
D/N/* - Disruptive test / Non-disruptive test / NA
S/* - Only applicable to standby unit / NA
X/* - Not a health monitoring test / NA
F/* - Fixed monitoring interval test / NA
E/* - Always enabled monitoring test / NA
A/I - Monitoring is active / Monitoring is inactive

```

```

 Test Interval
ID Test Name Attributes day hh:mm:ss.
====
1) TestModenaSample -----> ***N***A 02010:10:10.10 99
2) TestModenaLLQDrops -----> ***N***A 02010:10:10.10 99

```

Table 201 describes the fields shown in the **show diagnostic content bay** displays.

**Table 201**      *show diagnostic content bay Field Descriptions*

| Field         | Description                                                                                                 |
|---------------|-------------------------------------------------------------------------------------------------------------|
| ID            | The identification number.                                                                                  |
| Test Name     | The name of the test that is run on the specific bay.                                                       |
| Attributes    | The test attribute for the specific bay.                                                                    |
| Test Interval | The test interval in the dd hh:mm:ss.ms format, indicating days, hours, minutes, seconds, and milliseconds. |

This example shows a sample output of the **show diagnostic content subslot 8/0** command that displays the test suite, monitoring interval, and test attributes for subslot 8/0 on the Cisco uBR10012 Universal Broadband Router.

```
Router# show diagnostic content subslot 8/0
```

```
Subslot 8/0: 5cable-mc520u-d, 5 ports
```

```
Diagnostics test suite attributes:
```

```
 M/C/* - Minimal bootup level test / Complete bootup level test / NA
```

```
 B/* - Basic ondemand test / NA
```

```
 P/V/* - Per port test / Per device test / NA
```

```
 D/N/* - Disruptive test / Non-disruptive test / NA
```

```
 S/* - Only applicable to standby unit / NA
```

```
 X/* - Not a health monitoring test / NA
```

```
 F/* - Fixed monitoring interval test / NA
```

```
 E/* - Always enabled monitoring test / NA
```

```
 A/I - Monitoring is active / Monitoring is inactive
```

```

ID Test Name Attributes Test Interval
day hh:mm:ss
=====

```

```

1) TestSampleProxy -----> ***N***I not configured n/a
2) Test520LLQDrops -----> **PN***A 000 01:00:00.00 1
3) TestBlazeIndexLeak -----> ***N***A 000 08:00:00.00 n/a
4) TestMemLeaks -----> ***N**F*A 000 02:00:00.00 n/a

```

**Related Commands**

| Command                                  | Description                                                                                                             |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>diagnostic bootup level</b>           | Sets the bootup diagnostic level.                                                                                       |
| <b>diagnostic monitor</b>                | Configures the health-monitoring diagnostic testing.                                                                    |
| <b>diagnostic ondemand</b>               | Configures the on-demand diagnostics.                                                                                   |
| <b>diagnostic schedule test</b>          | Sets the scheduling of test-based diagnostic testing for a specific module or schedules a supervisor engine switchover. |
| <b>show diagnostic description</b>       | Describes the diagnostic tests.                                                                                         |
| <b>show diagnostic bootup</b>            | Displays the configured diagnostics level at bootup.                                                                    |
| <b>show diagnostic events</b>            | Displays the diagnostic event log.                                                                                      |
| <b>show diagnostic ondemand settings</b> | Displays the settings for the on-demand diagnostics.                                                                    |
| <b>show diagnostic result</b>            | Displays the diagnostic test results for a module.                                                                      |
| <b>show diagnostic schedule</b>          | Displays the current scheduled diagnostic tasks.                                                                        |



| Command                          | Description                                         |
|----------------------------------|-----------------------------------------------------|
| <b>show diagnostic status</b>    | Displays the running diagnostics tests.             |
| <b>diagnostic ondemand</b>       | Configures the on-demand diagnostics.               |
| <b>diagnostic event-log size</b> | Modifies the diagnostic event-log size dynamically. |
| <b>diagnostic start</b>          | Runs the specified diagnostic test.                 |
| <b>diagnostic stop</b>           | Stops the testing process.                          |

# show diagnostic ood-status

To display status information, such as the line card slot and name, Field Diagnostic image status, and overall results from previous diagnostic tests, enter the **show diagnostic ood-status** command.

**show diagnostic ood-status** [*slot slot-number* | *subslot slot-number/subslot-number*] [*detail*]

|                    |                |                                                                                                                 |
|--------------------|----------------|-----------------------------------------------------------------------------------------------------------------|
| Syntax Description | slot           | Specifies that the status information will be viewed for a line card in a full slot.                            |
|                    | subslot        | Specifies that the status information will be viewed for a line card in a subslot.                              |
|                    | slot-number    | Specifies the slot number of the line card whose status information will appear in the command output.          |
|                    | subslot-number | Specifies the subslot number of the line card whose status information will appear in the command output.       |
|                    | detail         | Displays the status information and the detailed test results of the specified line card in the command output. |

Command Default      No default behavior or values.

Command Modes      Privileged EXEC (#)

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.3(33)SCC | This command was introduced. |

**Usage Guidelines**

The **show diagnostic ood-status** output discloses if a line card supports Field Diagnostic testing and if the line card has already downloaded a Field Diagnostic image. Therefore, the **show diagnostic ood-status** command is useful as a reference before loading the Field Diagnostic image onto the line card.

It is important to note that the **show diag** and **show diagnostic** commands produce completely different outputs. Therefore, the **show diagnostic** output cannot be gathered using **show diag** because the autocomplete function will generate the **show diag**, not the **show diagnostic**, output. If you want to abbreviate the **show diagnostic** command, the shortest possible abbreviation is **show diagn**.

**Examples**

In the following example, the **show diagnostic ood-status** command is used to view status information of all the line card in the uBR10012 router.

```
Router# show diagnostic ood-status

Load for five secs: 0%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *05:56:50.835 EDT Thu Nov 5 2009

==== =====
```

| Slot | Card Description  | FDiag Support | Loaded Image Type | Overall Diag Result | Current Card State |
|------|-------------------|---------------|-------------------|---------------------|--------------------|
| A    | Active PRE2-RP    | YES           | IOS               | N/A                 | ONLINE             |
| B    | Standby PRE2-RP   | YES           | N/A               | N/A                 | OFFLINE            |
| 1    | 2jacket-1         | YES           | LCDOS             | N/A                 | ONLINE             |
|      | 2cable-dtcc       | NO            | LCDOS             | N/A                 | ONLINE             |
| 2/1  | 2cable-tccplus    | NO            | LCDOS             | N/A                 | ONLINE             |
| 3/0  | 1gigethernet-hh-1 | YES           | LCDOS             | N/A                 | ONLINE             |
| 3/1  | 1gigethernet-hh-1 | YES           | LCDOS             | N/A                 | ONLINE             |
| 5/0  | 5cable-mc520h-d   | YES           | IOS               | N/A                 | ONLINE             |
| 6/0  | 5cable-mc520h-d   | YES           | Field Diag        | N/A                 | DIAG READY         |
| 8/1  | 5cable-mc520u-d   | YES           | IOS               | N/A                 | ONLINE             |

**Table 202** *show diagnostic ood-status Field Descriptions*

| Field             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Slot              | Identifies the slot on the router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Card Description  | A text explanation of the line card in the specified slot.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| FDiag Support     | Indicates whether the line card in the specific slot supports Field Diagnostic testing. <ul style="list-style-type: none"> <li>• Yes—the line card in the slot supports Field Diagnostic testing.</li> <li>• No—the card in the slot does not support Field Diagnostic testing.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                             |
| Loaded Image Type | Specifies the run-time image for each line card. <ul style="list-style-type: none"> <li>• Field Diag—Indicates that the Field Diagnostic image is loaded on the line card. A line card will either have the Field Diagnostic or LCDOS image.</li> <li>• IOS—Specifies that the processor is running Cisco IOS.</li> <li>• LCDOS—Line card DOS. The LCDOS image is the image the line card is running during normal router operation. It is removed temporarily when a Field Diagnostic image is loaded onto the line card and loaded back onto a line card when a Field Diagnostic image is unloaded.</li> </ul> <p><b>Note</b> The LCDOS image is not loaded on cable line cards.</p> |

**Table 202**      *show diagnostic ood-status Field Descriptions (continued)*

| Field               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Overall Diag Result | <p>Displays the result of the last performed Field Diagnostic test, assuming the Field Diagnostic image has not been removed since the last test.</p> <ul style="list-style-type: none"> <li>• Pass—This line card passed the last diagnostic test.</li> <li>• Fail—At least one Field Diagnostic test failed during the last diagnostic test.</li> <li>• N/A—This line card has not been tested.</li> </ul>                                                                                      |
| Current Card State  | <p>The current card state:</p> <ul style="list-style-type: none"> <li>• Diag Ready—A diagnostic image is loaded onto the line card and Field Diagnostic tests can be run.</li> <li>• Running Diag—A diagnostic image is loaded on to the line card and is currently being run.</li> <li>• Offline—The line card is not currently passing traffic and no Field Diagnostic image has been downloaded onto the line card.</li> <li>• Online—The line card is active and can pass traffic.</li> </ul> |

In the following sample output, the test results per line card is displayed when the **show diagnostic ood-status** command is used along with **subslot** and **detail** keywords. The output displays diagnostic status of the line card along with details of the tests being run and their status.

Router# **show diagnostic ood-status subslot 6/0 detail**

```

=====
Slot Card Description FDiag Loaded Overall Current

6/0 5cable-mc520h-d YES Field N/A RUNNING
=====

```

Detail testing progress for card in slot 6/0:

Current card state: RUNNING DIAG

```

ID Test Name [Selected To Run (Y/N)] Test Status
=====
 1) Lookout2 RW test [Y] Passed
 2) Lookout2 R/W Intr bits [Y] Passed
 3) Lookout2 Reset test [Y] Passed
 4) JIB2 PCI ID test [Y] Passed
 5) JIB2 Register read/write test [Y] Passed
 6) JIB2 R/W Intr bits [Y] Passed
 7) JIB2 Reset test [Y] Passed
 8) JIB2 ifa6 SDRAM Test [Y] Running
 9) JIB2 ECC Disabled SDRAM Test [Y] Not Run
10) JIB2 Data Bus/Address SDRAM Test [Y] Not Run
11) JIB2 ifa6 SSRAM Test [Y] Not Run
12) JIB2 Data Bus/Address SSRAM Test [Y] Not Run
13) Mfpga R/W Intr bits [Y] Not Run
14) Mfpga Register read/write test [Y] Not Run
15) Mfpga Reset test [Y] Not Run
16) Internal Timer Test [Y] Not Run

```

```

17) Random Register Test [Y] Not Run
18) Processor Id Test [Y] Not Run
19) Ping Test [Y] Not Run
20) Core2 Memory Access Test [Y] Not Run
21) L1 Cache Test [Y] Not Run
22) core 2 L1 Cache Test [Y] Not Run
23) System DDR Test [Y] Not Run
24) Local UART Port 0 Internal Loopback Test . [Y] Not Run
25) Local UART Port 1 Internal Loopback Test . [Y] Not Run
26) PCI Bridge R/W Test [Y] Not Run
27) PCI Bridge ID Test [Y] Not Run
28) DM Channel Test [Y] Not Run
29) SMM665 Voltage Test [Y] Not Run
30) MarchingPattern_nvram [Y] Not Run
31) DataPins_nvram [Y] Not Run

```

Router#

**Table 203** *show diagnostic ood-status subplot x/y detail Field Descriptions*

| Field              | Description                                                                                                                 |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Current card state | Specifies the card state.                                                                                                   |
| ID                 | The test identification number.                                                                                             |
| Test Name          | The name of the test.                                                                                                       |
| Selected to Run    | Specifies whether the test was specified to run. Y indicates the test will be run and N indicates the test will not be run. |
| Test Status        | Provides the current test status.                                                                                           |

**Related Commands**

| Command                                      | Description                                                                                                         |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>diagnostic event-log size</b>             | Sets the size of the event table.                                                                                   |
| <b>diagnostic load</b>                       | Loads the Field Diagnostic image onto the line card.                                                                |
| <b>diagnostic ondemand action-on-failure</b> | Sets the number of errors allowed in the Field Diagnostic test before the Field Diagnostic test is stopped.         |
| <b>diagnostic ondemand iterations</b>        | Sets the number of times each specific Field Diagnostic test will be run when a Field Diagnostic test is initiated. |
| <b>diagnostic start</b>                      | Starts Field Diagnostic testing on the line card.                                                                   |
| <b>diagnostic stop</b>                       | Stops an in-progress Field Diagnostic test.                                                                         |
| <b>diagnostic unload</b>                     | Unloads the Field Diagnostic image from the line card and restores normal line card operation.                      |
| <b>show diag</b>                             | Shows information of all the line cards in the uBR10012 router, per slot, per subplot.                              |
| <b>show diagnostic content</b>               | Shows the Field Diagnostic test list for a particular line card.                                                    |
| <b>show diagnostic events</b>                | Displays the history of Field Diagnostic events since the last system reload.                                       |

# show diagnostic result

To display the diagnostic test results for a module, use the **show diagnostic result** command in user EXEC or privileged EXEC mode.

```
show diagnostic result [[bay slot/bay | slot slot-no | subslot slot/subslot] {detail | test {test-id | test-id-range | all}} | all]
```

| Syntax Description                  |                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>bay</b> <i>slot/bay</i>          | (Optional) Indicates the card slot and bay number for which the diagnostic test results are displayed. The <b>bay</b> keyword is used to refer a SPA on Cisco uBR10012 Universal Broadband Router. The valid range to specify slot is 1 to 8 and the valid range for bay is 0 to 3.                                           |
| <b>slot</b> <i>slot-no</i>          | (Optional) Indicates the slot number of the full-height line card for which the diagnostic test results have to be displayed. The <b>slot</b> keyword is used to refer a full-height line card on Cisco uBR10012 Universal Broadband Router. The valid range for the slot number is from 1 to 8.                              |
| <b>subslot</b> <i>slot/sub-slot</i> | (Optional) Indicates the slot and subslot number of the half-height line card for which the diagnostic test results have to be displayed. The <b>subslot</b> keyword is used to refer a half-height line card on Cisco uBR10012 Router. The valid range to specify slot is 1 to 8 and the valid range for sub-slot is 0 to 1. |
| <b>all</b>                          | (Optional) Displays diagnostic test results for all the SPAs, full-height line cards, and half-height line cards.                                                                                                                                                                                                             |
| <i>list</i>                         | List of modules in the following format: <ul style="list-style-type: none"><li>• Entries separated by a comma, for example, 1,4,6-10.</li><li>• Ranges specified with a hyphen, for example, 1-4,6-10.</li></ul>                                                                                                              |
| <i>slot</i>                         | Single module by slot number.                                                                                                                                                                                                                                                                                                 |
| <i>slot/subslot</i>                 | Single sub module by slot number and subslot or bay within the module.                                                                                                                                                                                                                                                        |
| <b>detail</b>                       | (Optional) Displays the detailed test results. The <b>detail</b> keyword is used along with the <b>bay</b> , <b>slot</b> , or <b>subslot</b> keywords to provide detailed test result information for a SPA, full-height line card, or half-height line card.                                                                 |
| <b>test</b> <i>test-id</i>          | (Optional) Displays test results only for the specified test-ids.                                                                                                                                                                                                                                                             |
| <b>test</b> <i>test-id-range</i>    | (Optional) Displays test results for the specified range of test ids.                                                                                                                                                                                                                                                         |
| <b>test</b> <i>all</i>              | (Optional) Displays the test results for all the tests running on the SPA, full-height line card, or half-height line card.                                                                                                                                                                                                   |

**Command Default**      None

**Command Modes**      User EXEC (>)  
Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                         |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCC | The command was introduced in this release to support the Generic Online Diagnostics (GOLD) functionality on the Cisco uBR10012 Universal Broadband Router. The keywords <b>bay</b> , <b>slot</b> , and <b>subslot</b> were added for the Cisco uBR10012 Universal Broadband Router. |

**Usage Guidelines**

In the command output, the possible testing results are as follows:

- Passed (.)
- Failed (F)
- Untested (U)

To display the results of a specific diagnostic test, specify the *test-id* number using the **test test-id** keyword and argument. The *test-id* numbers for available diagnostic tests are displayed in the output of the **show diagnostic content** command.

You can use the **show diagnostic description** command to see a detailed description of a diagnostic test.

The command syntax to refer a line card or SPAs is different on Cisco uBR10012 Router. The keyword is **slot x** for a full-height line card, **slot x/y** for a half-height card, and **bay x/y** for a SPA.

**Note**

To view the diagnostic test results for a SPA, full-height line card, or half-height line card use the **show diagnostic result** command along with the **bay**, **slot**, or **subslot** keywords respectively.

The GOLD test cases used to poll for system errors in Cisco IOS Software Release 12.2(33)SCC are Low Latency Queueing (LLQ) drop, Cable Line Card (CLC) memory leak, and Guardian index leak tests.

**Examples**

The following example shows a sample output of the **show diagnostic result all** command. The output displays a summary of test results on all the SPAs, full-height line cards, and half-height line cards on the Cisco uBR10012 Router:

```
Router# show diagnostic result all

Current bootup diagnostic level: minimal
Slot 1: 2jacket-1 SerialNo : CAT1146E05
Overall diagnostic result: UNTESTED
Diagnostic level at card bootup: minimal
Test results: (. = Pass, F = Fail, U = Untested)

 1) TestJacketSample -----> U

 Bay 1/0: 2jacket-1 SerialNo : N/A

 Overall diagnostic result: PASS
 Diagnostic level at card bootup: minimal

 Test results: (. = Pass, F = Fail, U = Untested)

 1) TestModenaSample -----> U
 2) TestModenaLLQDrops -----> .

Subslot 5/0: 5cable-mc520u-d, 5 ports SerialNo : CAT10210T9
```

## show diagnostic result

```

Overall diagnostic result: PASS
Diagnostic level at card bootup: minimal

Test results: (. = Pass, F = Fail, U = Untested)

1) TestSampleProxy -----> U
2) Test520LLQDrops:

 Port 0 1 2 3 4

3) TestBlazeIndexLeak -----> U
4) TestMemLeaks -----> .

Subslot 8/0: 5cable-mc520u-d, 5 ports SerialNo : CAT08410SS

Overall diagnostic result: PASS
Diagnostic level at card bootup: minimal

Test results: (. = Pass, F = Fail, U = Untested)

1) TestSampleProxy -----> U
2) Test520LLQDrops:

 Port 0 1 2 3 4

3) TestBlazeIndexLeak -----> .
4) TestMemLeaks -----> .

Subslot 8/1: 5cable-mc520u-d, 5 ports SerialNo : CAT10251S2

Overall diagnostic result: PASS
Diagnostic level at card bootup: minimal

Test results: (. = Pass, F = Fail, U = Untested)

1) TestSampleProxy -----> U
2) Test520LLQDrops:

 Port 0 1 2 3 4

3) TestBlazeIndexLeak -----> U
4) TestMemLeaks -----> .

```

The following example shows a sample output of the **show diagnostic result subslot 5/0 detail** command. The command output provides useful details such as overall diagnostic results and the time-related values of various important parameters, which help in identifying and resolving the issue:

```

Router# show diagnostic result subslot 5/0 detail

Current bootup diagnostic level: minimal
Subslot 5/0: 5cable-mc520u-d, 5 ports SerialNo : CAT10210T9

Overall diagnostic result: PASS
Diagnostic level at card bootup: minimal

Test results: (. = Pass, F = Fail, U = Untested)

1) TestSampleProxy -----> U
 Error code -----> 0 (DIAG_SUCCESS)

```



```

Total run count -----> 0
Last test execution time -----> n/a
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> n/a
Total failure count -----> 0
Consecutive failure count -----> 0

```

---

2) Test520LLQDrops:

```

Port 0 1 2 3 4

.
Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 17
Last test execution time -----> Aug 11 2009 09:42:22
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> Aug 11 2009 09:42:22
Total failure count -----> 0
Consecutive failure count -----> 0

```

---

```

3) TestBlazeIndexLeak -----> U
Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 1
Last test execution time -----> Aug 11 2009 00:42:19
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> Aug 11 2009 00:42:19
Total failure count -----> 0
Consecutive failure count -----> 0

```

---

```

4) TestMemLeaks -----> .
Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 7
Last test execution time -----> Aug 11 2009 06:42:19
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> Aug 11 2009 06:42:19
Total failure count -----> 0
Consecutive failure count -----> 0

```

---

## Related Commands

| Command                                  | Description                                          |
|------------------------------------------|------------------------------------------------------|
| <b>show diagnostic content</b>           | Displays the available diagnostic tests.             |
| <b>show diagnostic description</b>       | Describes the diagnostic tests.                      |
| <b>show diagnostic bootup</b>            | Displays the configured diagnostics level at bootup. |
| <b>show diagnostic events</b>            | Displays the diagnostic event log.                   |
| <b>show diagnostic ondemand settings</b> | Displays the settings for the on-demand diagnostics. |
| <b>show diagnostic result</b>            | Displays the diagnostic test results for a module.   |
| <b>show diagnostic schedule</b>          | Displays the current scheduled diagnostic tasks.     |
| <b>show diagnostic status</b>            | Displays the running diagnostics tests.              |

| Command                               | Description                                                                     |
|---------------------------------------|---------------------------------------------------------------------------------|
| <b>diagnostic start</b>               | Runs the specified diagnostic test.                                             |
| <b>diagnostic stop</b>                | Stops the testing process.                                                      |
| <b>show diagnostic content module</b> | Displays the available diagnostic tests.                                        |
| <b>diagnostic bootup level</b>        | Configures the diagnostic bootup level.                                         |
| <b>diagnostic event-log size</b>      | Modifies the diagnostic event-log size dynamically.                             |
| <b>diagnostic monitor</b>             | Configures the health-monitoring diagnostic testing.                            |
| <b>diagnostic ondemand</b>            | Configures the on-demand diagnostics.                                           |
| <b>diagnostic schedule</b>            | Sets the scheduling of diagnostic testing for a specific bay, slot, or subslot. |

# show diagnostic schedule

To display the scheduled diagnostic tasks, use the **show diagnostic schedule** command in user EXEC or privileged EXEC mode.

**show diagnostic schedule** [**all** | **bay** *slot/bay* | **slot** *slot-no* | **subslot** *slot/subslot*]

|                    |                                     |                                                                                                                                                                                                                                                                                                                |
|--------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>all</b>                          | Displays the scheduled diagnostic tasks for all the installed SPAs, full-height line cards, and half-height line cards on the Cisco uBR10012 Universal Broadband Router.                                                                                                                                       |
|                    | <b>bay</b> <i>slot/bay</i>          | (Optional) Indicates the card slot and bay number for which the scheduled diagnostic tasks is displayed. The <b>bay</b> keyword is used to refer a SPA on the router. The valid range for the slot number is from 1 to 8 and 0 to 3 for the bay number.                                                        |
|                    | <b>slot</b> <i>slot-no</i>          | (Optional) Indicates the slot number of the full-height line card for which the scheduled diagnostic tasks is displayed. The <b>slot</b> keyword is used to refer a full-height line card on the router. The valid range for slot is 1 to 8.                                                                   |
|                    | <b>subslot</b> <i>slot/sub-slot</i> | (Optional) Indicates the slot and subslot number of the half-height line card for which the scheduled diagnostic tasks have to be displayed. The <b>subslot</b> keyword is used to refer a half-height line card on the router. The valid range for the slot number is from 1 to 8 and 0 to 1 for the subslot. |

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                                      |
|---------------|--------------------------------------|
| Command Modes | User EXEC (>)<br>Privileged EXEC (#) |
|---------------|--------------------------------------|

| Command History | Release     | Modification                                                                                                                                                                                                                                                                  |
|-----------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCC | The command was introduced in this release to support Generic Online Diagnostics (GOLD) functionality for Cisco uBR10012 Universal Broadband Router. The keywords <b>bay</b> , <b>slot</b> , and <b>subslot</b> were added for the Cisco uBR10012 Universal Broadband Router. |

|                  |                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | Diagnostic tests for a specific bay, slot, or subslot can be scheduled daily, weekly, or on specific dates and time using the <b>diagnostic schedule</b> command from global configuration mode. The <b>show diagnostic schedule</b> command output displays the diagnostic tests that have been scheduled for the bay, slot, or subslot using the command <b>diagnostic schedule</b> . |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | This example shows a sample output of the <b>show diagnostic schedule slot 1</b> command that displays diagnostic tasks scheduled for slot 1 on the Cisco uBR10012 Universal Broadband Router: |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Router# **show diagnostic schedule slot 1**

## show diagnostic schedule

Current Time = 13:55:35 EST Tue Aug 11 2009

Diagnostic for Slot 1:

Schedule #1:

To be run on September 1 2009 12:00

Test ID(s) to be executed: 1.

This example shows a sample output of how to display the diagnostic tasks scheduled for all the bays, full-height line cards, and half-height line cards installed on the Cisco uBR10012 Universal Broadband Router:

Router# **show diagnostic schedule all**

Current Time = 14:05:41 EST Tue Aug 11 2009

Diagnostic for Slot 1:

Schedule #1:

To be run on September 1 2009 12:00

Test ID(s) to be executed: 1.

Diagnostic for Bay 1/0 is not scheduled.

Diagnostic for Subslot 5/0 is not scheduled.

Diagnostic for Subslot 8/0:

Schedule #1:

To be run daily 12:00

Test ID(s) to be executed: 2.

Diagnostic for Subslot 8/1:

Schedule #1:

To be run weekly Sunday 12:00

Test ID(s) to be executed: 3.

### Related Commands

| Command                                  | Description                                                               |
|------------------------------------------|---------------------------------------------------------------------------|
| <b>diagnostic schedule</b>               | Sets the diagnostic test schedule for a particular bay, slot, or subslot. |
| <b>show diagnostic description</b>       | Provides the description for the diagnostic tests.                        |
| <b>diagnostic start</b>                  | Runs the specified diagnostic test.                                       |
| <b>diagnostic stop</b>                   | Stops the testing process.                                                |
| <b>show diagnostic content module</b>    | Displays the available diagnostic tests.                                  |
| <b>diagnostic bootup level</b>           | Configures the diagnostic bootup level.                                   |
| <b>diagnostic event-log size</b>         | Modifies the diagnostic event-log size dynamically.                       |
| <b>diagnostic monitor</b>                | Configures the health-monitoring diagnostic testing.                      |
| <b>diagnostic ondemand</b>               | Configures the on-demand diagnostics.                                     |
| <b>show diagnostic bootup</b>            | Displays the configured diagnostics level at bootup.                      |
| <b>show diagnostic events</b>            | Displays the diagnostic event log.                                        |
| <b>show diagnostic ondemand settings</b> | Displays the settings for the on-demand diagnostics.                      |
| <b>show diagnostic result</b>            | Displays the diagnostic test results for a module.                        |
| <b>show diagnostic schedule</b>          | Displays the current scheduled diagnostic tasks.                          |
| <b>show diagnostic status</b>            | Displays the running diagnostics tests.                                   |

# show facility-alarm status

To display the current temperature thresholds that will trigger a facility alarm, use the **show facility-alarm status** command in user EXEC or privileged EXEC mode.

**show facility-alarm status** [*severity*]

|                           |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>severity</i> | (Optional) String that identifies the severity of an alarm. The default severity level is info, which shows all alarms. Severity levels are defined as the following: <ul style="list-style-type: none"><li>• <b>critical</b>—Only critical alarms are shown.</li><li>• <b>major</b>—All major and critical facility alarms are shown.</li><li>• <b>minor</b>—All minor, major, and critical facility alarms are shown.</li><li>• <b>info</b>—All facility alarms are shown.</li><li>• <b>phy-index</b>—All facility alarms for the specified physical index entity are shown.</li></ul> |
|---------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                        |                       |
|------------------------|-----------------------|
| <b>Command Default</b> | All alarms are shown. |
|------------------------|-----------------------|

|                      |                                |
|----------------------|--------------------------------|
| <b>Command Modes</b> | User EXEC, Privileged EXEC (#) |
|----------------------|--------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                 |
|------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.2(1)XF1     | This command was introduced for the Cisco uBR10012 router.                                                                          |
|                        | 12.3BC         | This command was integrated into Cisco IOS Release 12.3BC.                                                                          |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                  |
|                        | 12.2(33)SCE4   | This command was modified. The <b>phy-index</b> keyword was added to the command for the Cisco uBR7200 series and uBR10012 routers. |

|                         |                                                                                                                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | When a severity level is identified, statuses of alarms at that level and higher are shown. For example, when you set a severity of major, all major and critical alarms are shown. |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The **show facility-alarm status** command does not show the real status of the upstream channel connector when frequency stacking is configured on the upstream channel.

**Note**

The **show facility-alarm status** command does not show the critical alarm temperature thresholds. You can display these values using the **show running-config | include facility** command. If this does not display any commands for critical alarms, then the temperature thresholds are set at their default values.

For additional information on Frequency Stacking feature, refer to the [Virtual Interfaces and Frequency Stacking Configuration on MC5x20S and MC28U Linecards](#) document on Cisco.com.

**Examples**

The following example shows a typical display of the **show facility-alarm status** command:

```
Router# show facility-alarm status
Thresholds:
Intake minor 40 major 49 critical 72
Core minor 45 major 53 critical 85
```

```
System Totals Critical: 0 Major: 0 Minor: 77
```

| Source        | Severity | ACO    | Description [Index]          |
|---------------|----------|--------|------------------------------|
| -----         | -----    | ---    | -----                        |
| chassis       | MINOR    | NORMAL | Core minor temperature limi] |
| Cable5/0-MAC0 | INFO     | NORMAL | Physical Port Administrativ] |
| Cable5/0-MAC1 | INFO     | NORMAL | Physical Port Administrativ] |
| Cable5/0-MAC2 | INFO     | NORMAL | Physical Port Administrativ] |
| Cable5/0-MAC3 | INFO     | NORMAL | Physical Port Administrativ] |
| Cable5/0-MAC4 | INFO     | NORMAL | Physical Port Administrativ] |
| Cable5/0-US0  | MINOR    | NORMAL | Physical Port Link Down [0]  |
| Cable5/0-US1  | MINOR    | NORMAL | Physical Port Link Down [0]  |
| Cable5/0-US2  | MINOR    | NORMAL | Physical Port Link Down [0]  |

```
Router#
```

The following example shows a typical display of the **show facility-alarm status phy-index** command:

```
Router# show facility-alarm status phy-index
```

```
Intake minor 40 major 49 critical 72
Core minor 45 major 53 critical 85
```

```
System Totals Critical: 4 Major: 1 Minor: 0
```

| PhyIdx | Source         | Severity | ACO    | Description [Index]          |
|--------|----------------|----------|--------|------------------------------|
| -----  | -----          | -----    | ---    | -----                        |
| 28     | RP A           | MAJOR    | NORMAL | Secondary failure [2]        |
| 46     | GigE1H 3/0/0   | CRITICAL | NORMAL | Physical Port Link Down [0]  |
| 48     | GigE1H 3/1/0   | CRITICAL | NORMAL | Physical Port Link Down [0]  |
| 5510   | Cable5/1-US4   | INFO     | NORMAL | Physical Port Administrative |
|        | State Down [1] |          |        |                              |
| 5511   | Cable5/1-US5   | INFO     | NORMAL | Physical Port Administrative |
|        | State Down [1] |          |        |                              |

```
Router#
```

[Table 204](#) describes the significant fields shown in the outputs.

**Table 204** *show facility-alarm status Field Descriptions*

| Field               | Description                                                                                                                                 |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| System Totals       | Total number of alarms generated, identified by severity.                                                                                   |
| PhyIdx              | The entity physical index for a specific alarm node.                                                                                        |
| Source              | Interface from which the alarm was generated.                                                                                               |
| Severity            | Severity level of the alarm generated.                                                                                                      |
| ACO                 | Alarm cutoff. It could be “NORMAL” or “CLEARED”.                                                                                            |
| Description [Index] | Type of the alarm and the index of the alarm type. The index can be any number based on the number of alarm types that the device supports. |

**Related Commands**

| Command                     | Description                                                                                                                               |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>clear facility-alarm</b> | Clears some or all of the facility alarms on the Cisco uBR10012 router.                                                                   |
| <b>facility-alarm</b>       | Sets the temperature thresholds at which the processor generates a critical, major, or minor alarm to warn of potential equipment damage. |

# show frame-clocks

To display information about the midplane time-division multiplexing (TDM) clock reference, use the **show frame-clocks** command in privileged EXEC mode.

**show frame-clocks**

**Syntax Description** This command has no keywords or arguments.

**Command Modes** Privileged EXEC

| Command History | Release    | Modification                                                                           |
|-----------------|------------|----------------------------------------------------------------------------------------|
|                 | 12.0(T)    | This command was introduced.                                                           |
|                 | 12.1(1a)T1 | This command was modified to include the cable clock card as the current clock source. |

**Examples** The following sample output from the **show frame-clocks** command shows that there are no clock sources configured and the clock card is the default clock source:

```
Router# show frame-clocks

Priority 1 clock source:not configured input:none
Priority 2 clock source:not configured input:none
Priority 3 clock source:not configured input:none
Priority 4 clock source:not configured input:none
Current clock source:Clockcard, input:Primary, priority:5
```

[Table 0-205](#) describes the fields displayed by the **show frame-clocks** command:

**Table 0-205 show frame-clocks Field Descriptions**

| Field                     | Description                                                                                                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------|
| Priority 1-4 clock source | The configuration of the four network clock sources.                                                              |
| Current clock source      | The current clock source, its input, and priority. In this example, the clock card is providing the clock source. |



**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

| Related Commands | Command                                 | Description                                     |
|------------------|-----------------------------------------|-------------------------------------------------|
|                  | <b>show cable clock</b>                 | Displays status information for the clock card. |
|                  | <b>show controllers clock-reference</b> | Displays the clock card's hardware information. |



# show hccp

To display information about HCCP groups associated with cable interfaces, use the **show hccp** command in user EXEC or privileged EXEC mode.

**show hccp** [*group* | **brief** | **channel-switch** | **detail** | **event-history** | **interface** | **linecard**]

| Syntax Description    |                                                                                                                                                                                                                                                                                                                                        |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group</i>          | (Optional) Group number to be displayed. The valid range is 1 to 255. It is a 1-based MAC domain number and hence on a: <ul style="list-style-type: none"> <li>Cisco uBR10-MC5X20 and Cisco UBR-MC20X20V line card, the group range is from 1 to 5.</li> <li>Cisco uBR-MC3GX60V line card, the group range is from 1 to 15.</li> </ul> |
| <b>brief</b>          | (Optional) Displays a brief summary of the groups, configuration types, member numbers, and status for cable interfaces. You can also use this option when displaying information for a specific group.                                                                                                                                |
| <b>channel-switch</b> | (Optional) Displays information about the channel-switch configuration.                                                                                                                                                                                                                                                                |
| <b>detail</b>         | (Optional) Displays a detailed summary of the groups, configuration types, member numbers, and status for cable interfaces, as well as the CLI commands that are being synchronized across interfaces.                                                                                                                                 |
| <b>event-history</b>  | (Optional) Displays information about switchover and sync events.                                                                                                                                                                                                                                                                      |
| <b>interface</b>      | (Optional) Displays a summary on each interface.                                                                                                                                                                                                                                                                                       |
| <b>linecard</b>       | (Optional) Displays line card-level HCCP information.                                                                                                                                                                                                                                                                                  |

**Command Modes** User EXEC, Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                                                            |
|-----------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(3a)EC  | This command was introduced.                                                                                                                                                                                            |
|                 | 12.2(4)BC1  | The <b>detail</b> option was added.                                                                                                                                                                                     |
|                 | 12.2(8)BC2  | The current time to resync and current wait to restore values were added to the display for the <b>brief</b> option.                                                                                                    |
|                 | 12.2(11)BC1 | Support was added for the Cisco uBR-RFSW N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.                                                          |
|                 | 12.2(15)BC2 | The output of the <b>show hccp detail</b> command was changed to show separate lists of the critical and non-critical CLI commands that are being synchronized for each Working and Protect interface and subinterface. |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB and the output of the <b>show hccp detail</b> command was changed to show CMTS interface pre-critical config information.                                |
|                 | 12.2(33)SCC | This command was integrated into Cisco IOS Release 12.2(33)SCC.                                                                                                                                                         |

| Release     | Modification                                                                                                                                                                                                                                                 |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCE | This command was modified. <b>line card</b> keyword was added.                                                                                                                                                                                               |
| 12.2(33)SCF | This command supports configuration of a card with a lower license as protect for a working card with a higher license. However, when a switchover occurs, this protect card does not become active until it is upgraded and reloaded with a higher license. |

### Usage Guidelines

Starting with Cisco IOS Release 12.2(33)SCF, you can configure a card with a lower license as the protect card for a working card with a higher license. This protect card remains in a nonfunctional mode (not in standby mode) and does not become active until it is upgraded and reloaded with a higher license, when a switchover occurs.

### Examples

The following examples are from the **show hccp** and **show hccp brief** commands for the entire chassis:

Router# **show hccp**

```
Cable4/0 - Group 1 Protect, enabled, blocking
authentication md5, key-chain "cisco1"
hello time 2000 msec, hold time 6000 msec
Member 1 standby
ip addr: working 10.20.111.11, protect 10.20.111.10
downstream wavecom (1.1.11.3/1, 1.1.11.3/2), upstream none
```

Router# **show hccp brief**

```
Interface Config Grp Mbr Status
Ca5/0/0 Protect 1 3 standby
Ca7/0/0 Working 1 3 active
```

In Cisco IOS Release 12.2(8)BC2 and later 12.2 BC releases, the **brief** option also shows the amount of time left before the next resynchronization and the time left before a restore:

Router# **show hccp brief**

```
Interface Config Grp Mbr Status WaitToResync WaitToRestore
Ca5/0/0 Protect 1 3 standby 00:01:50.892
Ca7/0/0 Working 1 3 active 00:00:50.892 00:01:50.892
```

Router#

The following example shows a sample output for the **show hccp channel-switch** command, displaying the groups and module numbers for each configured member:

Router# **show hccp channel-switch**

Grp 1 Mbr 1 Working channel-switch:

```
"uc" - enabled, frequency 555000000 Hz
"rfswitch" - module 1, normal
module 3, normal
module 5, normal
module 7, normal
module 11, normal
```

Grp 2 Mbr 1 Working channel-switch:

```
"uc" - enabled, frequency 555000000 Hz
"rfswitch" - module 2, normal
module 4, normal
```

```

 module 6, normal
 module 9, normal
 module 13, normal
Grp 1 Mbr 7 Protect channel-switch:
 "uc" - disabled, frequency 555000000 Hz
 "rfswitch" - module 1, normal
 module 3, normal
 module 5, normal
 module 7, normal
 module 11, normal
Grp 1 Mbr 5 Protect channel-switch:
 "uc" - disabled, frequency 555000000 Hz
 "rfswitch" - module 1, normal
 module 3, normal
 module 5, normal
 module 7, normal
 module 11, normal

```

Router#

The following example shows the first part of the display for the **detail** option of this command, which first displays chassis-wide configuration information. The command then displays the CLI configuration commands that are being synchronized for each subinterface.

Router# **show hccp detail**

```

HCCP software version 3.0
Cable3/0 - Group 1 Protect, enabled, blocking
 authentication none
 hello time 2000 msec, hold time 6000 msec, revertive
 track interfaces: Cable3/0
 sync time 1000 msec, suspend time 120000 msec
 local state is Learn, tran 54940
 last switch reason is internal
 last HELLO tran 54940, elapsed 672 msec, hello timer expires in 00:00:01.328
 switchover member 1, wait to restore in 00:01:24.580
 control plane relays sync packets
Fast syncpulse detection is enabled
statistics:
 standby_to_active 23, active_to_standby 23
 active_to_active 0, standby_to_standby 1
Member 1 standby
 target ip address: protect 10.10.10.2, working 10.10.10.1
 channel-switch "uc" (wavecom-ma, 10.10.10.3/2, 10.10.10.3/1) enabled
 tran #: SYNC 17209, last SYNC_ACK 46592
 hold timer expires in 00:00:05.328
 interface config:
 mac-address 0000.0000.3030
 cmts config:
 bundle 1 master, resolve sid, dci-response success,
 downstream - frequency 555000000, channel id 0
 downstream - insertion_invl auto min = 60, max = 480
 upstream 0 - frequency 100000000, power level 0
 upstream 0 - modulation-profile 1, channel-width 3200000
 upstream 0 - cnr-profile1 25, cnr-profile2 15
 corr-fec 1, uncorr-fec 1
 upstream 0 - hop-priority frequency modulation channel-width
 upstream 1 - frequency 120000000, power level 0
 upstream 1 - modulation-profile 1, channel-width 3200000
 upstream 1 - cnr-profile1 25, cnr-profile2 15
 corr-fec 1, uncorr-fec 1
 upstream 1 - hop-priority frequency modulation channel-width
 upstream 2 - frequency 140000000, power level 0
 upstream 2 - modulation-profile 1, channel-width 3200000

```

## ■ show hccp

```

 upstream 2 - cnr-profile1 25, cnr-profile2 15
 corr-fec 1, uncorr-fec 1
 upstream 2 - hop-priority frequency modulation channel-width
 upstream 3 - frequency 16000000, power level 0
 upstream 3 - modulation-profile 1, channel-width 3200000
 upstream 3 - cnr-profile1 25, cnr-profile2 15
 corr-fec 1, uncorr-fec 1
 upstream 3 - hop-priority frequency modulation channel-width
sub-interface 200 config:
 ip address 10.23.240.1 255.255.255.0
 ip address 213.57.42.254 255.255.255.128 secondary
 ip helper-address 213.57.75.70
 ip helper-address 213.57.75.66, ip access-group 87 in, ip access-group 87 out
 cable helper-address 213.57.75.70
 cable helper-address 213.57.75.66
 cable arp, proxy-arp,
 cable ip-multicast-echo,
 cable dhcp-giaddr policy,
sub-interface 8 config:
 ip address 10.23.128.1 255.255.240.0
 ip address 62.90.198.254 255.255.255.0 secondary
 ip helper-address 213.57.75.70
 ip helper-address 213.57.75.66, ip access-group BARAK in, ip access-group
ANTI_TRACE out
 cable helper-address 213.57.75.70
 cable helper-address 213.57.75.66
 cable arp, proxy-arp,
 cable ip-multicast-echo,
 cable dhcp-giaddr policy,
sub-interface 1 config:
 ip address 3.0.1.1 255.255.0.0
 ip address 99.99.1.1 255.255.255.0 secondary
 ip address 99.99.2.1 255.255.255.0 secondary
 ip address 99.99.3.1 255.255.255.0 secondary
 ip address 99.99.4.1 255.255.255.0 secondary
 ip helper-address 1.9.62.10
 ip helper-address 1.9.62.11, ip access-group no_netbios2 in, ip access-group
no_netbios2 out
 ip pim sparse-dense-mode
 cable arp,
 cable ip-multicast-echo
. . .

Router#

```

In Cisco IOS Release 12.2(15)BC2 and later releases, the **show hccp detail** command shows the critical and non-critical synchronized CLI commands in separate lists for each cable interface and subinterface:

```

Router# show hccp detail

HCCP software version 3.0
Cable5/0/0 - Group 1 Working, enabled, forwarding
 authentication none
 hello time 5000 msec, hold time 15000 msec, revert time 30 min
 track interfaces: Cable5/0/0
 sync time 1000 msec, suspend time 120000 msec
 switch time 240000 msec retries 5
 local state is Teach, tran 9
 in sync, out staticsync, start static sync in never
 last switch reason is internal
 data plane directly sends sync packets
 statistics:
 standby_to_active 2, active_to_standby 1
 active_to_active 0, standby_to_standby 0

```

```

Member 5 active
 target ip address: protect 222.1.1.9, working 222.1.1.9
 channel-switch "uc" (wavecom-hd, 1.10.45.11/7, 1.10.45.11/4) enabled
 channel-switch "rfsw" (rfswitch-group, 1.10.52.33/0x40100000/8) enabled
 tran #: SYNC 9, last SYNC_ACK 0, last HELLO_ACK 54
 hold timer expires in 00:00:13.180
Cable6/0/0 - Group 1 Protect, enabled, blocking
 authentication none
 hello time 5000 msec, hold time 15000 msec, revertive
 track interfaces: Cable6/0/0
 sync time 1000 msec, suspend time 120000 msec
 local state is Learn, tran 54
 last switch reason is none
 last HELLO tran 54, elapsed 3928 msec, hello timer expires in 00:00:01.068
 data plane directly sends sync packets
 statistics:
 standby_to_active 0, active_to_standby 0
 active_to_active 0, standby_to_standby 4
Member 6 standby
 target ip address: protect 222.1.1.9, working 222.1.1.9
 channel-switch "rfsw" (rfswitch-group, 1.10.52.33/0x40100000/7) enabled
 channel-switch "uc" (wavecom-hd, 1.10.45.11/7, 1.10.45.11/6) enabled
 tran #: SYNC 0, last SYNC_ACK 9
 hold timer expires in 00:00:11.068
 Interface Generic Critical Config
 =====
int Cable6/0/0
 mac-address 00e0.6666.1288
end

 CMTS interface critical config
 =====
int Cable6/0/0
 cable downstream annex B
 cable downstream modulation 64qam
 cable downstream interleave-depth 32
 cable downstream frequency 44100000
 cable downstream channel-id 60
 cable upstream 0 frequency 11408000
 cable upstream 0 power-level 0
 cable upstream 0 channel-width 1600000
 cable upstream 0 minislot-size 4
 cable upstream 0 modulation-profile 1
 no cable upstream 0 shutdown
 cable upstream 1 power-level 0
 cable upstream 1 channel-width 1600000
 cable upstream 1 minislot-size 4
 cable upstream 1 modulation-profile 1
 cable upstream 1 shutdown
 cable upstream 2 power-level 0
 cable upstream 2 channel-width 1600000
 cable upstream 2 minislot-size 4
 cable upstream 2 modulation-profile 1
 cable upstream 2 shutdown
 cable upstream 3 power-level 0
 cable upstream 3 channel-width 1600000
 cable upstream 3 minislot-size 4
 cable upstream 3 modulation-profile 1
 cable upstream 3 shutdown
end

 Generic sub-interface master critical config
 =====
int Cable6/0/0

```

```

end

 CMTS subinterface critical config
 =====
int Cable6/0/0
end

 Non Critical config
 =====
int Cable6/0/0
!
no ip address
no keepalive
cable bundle 1
end

Member 5 standby
target ip address: protect 222.1.1.9, working 222.1.1.9
channel-switch "uc" (wavecom-hd, 1.10.45.11/7, 1.10.45.11/4) enabled
channel-switch "rfsw" (rfswitch-group, 1.10.52.33/0x40100000/8) enabled
tran #: SYNC 0, last SYNC_ACK 9
hold timer expires in 00:00:13.756
Interface Generic Critical Config
=====
int Cable6/0/0
mac-address 00e0.6666.1270
end

 CMTS interface critical config
 =====
int Cable6/0/0
cable bundle 1 master
cable downstream annex B
cable downstream modulation 64qam
cable downstream interleave-depth 32
cable downstream frequency 441000000
cable downstream channel-id 60
cable upstream 0 frequency 11408000
cable upstream 0 power-level 0
cable upstream 0 channel-width 1600000
cable upstream 0 minislot-size 4
cable upstream 0 modulation-profile 1
no cable upstream 0 shutdown
cable upstream 1 power-level 0
cable upstream 1 channel-width 1600000
cable upstream 1 minislot-size 4
cable upstream 1 modulation-profile 1
cable upstream 1 shutdown
cable upstream 2 power-level 0
cable upstream 2 channel-width 1600000
cable upstream 2 minislot-size 4
cable upstream 2 modulation-profile 1
cable upstream 2 shutdown
cable upstream 3 power-level 0
cable upstream 3 channel-width 1600000
cable upstream 3 minislot-size 4
cable upstream 3 modulation-profile 1
cable upstream 3 shutdown
end

 Generic sub-interface master critical config
 =====
int Cable6/0/0
ip address 12.1.1.1 255.255.255.0 secondary

```

```

ip address 1.6.1.65 255.255.255.0
end

 CMTS subinterface critical config
 =====
int Cable6/0/0
end

 Non Critical config
 =====
int Cable6/0/0
!
end

 Generic sub-interface master critical config
 =====
int Cable6/0/0
end

 CMTS subinterface critical config
 =====
int Cable6/0/0
end

 Non Critical config
 =====
int Cable6/0/0
!
no ip address
no keepalive
end

Router#

```

In Cisco IOS Release 12.2(33)SCB and later releases, the **show hccp detail** command shows CMTS interface pre-critical configuration information as part of the critical and non-critical synchronized CLI commands:

Router# **show hccp detail**

```

HCCP software version 3.0
Cable5/0/0 - Group 1 Working, enabled, forwarding
 authentication none
 hello time 5000 msec, hold time 15000 msec, revert time 30 min
 track interfaces: Cable5/0/0
 sync time 1000 msec, suspend time 120000 msec
 switch time 240000 msec retries 5
 local state is Teach, tran 9
 in sync, out staticsync, start static sync in never
 last switch reason is internal
 data plane directly sends sync packets
 statistics:
 standby_to_active 2, active_to_standby 1
 active_to_active 0, standby_to_standby 0
 Member 5 active
 target ip address: protect 222.1.1.9, working 222.1.1.9
 channel-switch "uc" (wavecom-hd, 1.10.45.11/7, 1.10.45.11/4) enabled
 channel-switch "rfsw" (rfswitch-group, 1.10.52.33/0x40100000/8) enabled
 tran #: SYNC 9, last SYNC_ACK 0, last HELLO_ACK 54
 hold timer expires in 00:00:13.180
Cable6/0/0 - Group 1 Protect, enabled, blocking
 authentication none
 hello time 5000 msec, hold time 15000 msec, revertive
 track interfaces: Cable6/0/0

```

```

sync time 1000 msec, suspend time 120000 msec
local state is Learn, tran 54
last switch reason is none
last HELLO tran 54, elapsed 3928 msec, hello timer expires in 00:00:01.068
data plane directly sends sync packets
statistics:
 standby_to_active 0, active_to_standby 0
 active_to_active 0, standby_to_standby 4
Member 6 standby
 target ip address: protect 222.1.1.9, working 222.1.1.9
 channel-switch "rfsw" (rfswitch-group, 1.10.52.33/0x40100000/7) enabled
 channel-switch "uc" (wavecom-hd, 1.10.45.11/7, 1.10.45.11/6) enabled
 tran #: SYNC 0, last SYNC_ACK 9
 hold timer expires in 00:00:11.068
 Interface Generic Critical Config
 =====
int Cable6/0/0
 mac-address 00e0.6666.1288
end

 CMTS interface pre-critical config
 =====
int Cable5/0/0
 cable downstream annex B
 cable downstream modulation 256qam
 cable downstream interleave-depth 32
end

 CMTS interface critical config
 =====
int Cable6/0/0
 cable downstream annex B
 cable downstream modulation 64qam
 cable downstream interleave-depth 32
 cable downstream frequency 441000000
 cable downstream channel-id 60
 cable upstream 0 frequency 11408000
 cable upstream 0 power-level 0
 cable upstream 0 channel-width 1600000
 cable upstream 0 minislot-size 4
 cable upstream 0 modulation-profile 1
 no cable upstream 0 shutdown
 cable upstream 1 power-level 0
 cable upstream 1 channel-width 1600000
 cable upstream 1 minislot-size 4
 cable upstream 1 modulation-profile 1
 cable upstream 1 shutdown
 cable upstream 2 power-level 0
 cable upstream 2 channel-width 1600000
 cable upstream 2 minislot-size 4
 cable upstream 2 modulation-profile 1
 cable upstream 2 shutdown
 cable upstream 3 power-level 0
 cable upstream 3 channel-width 1600000
 cable upstream 3 minislot-size 4
 cable upstream 3 modulation-profile 1
 cable upstream 3 shutdown
end

 Generic sub-interface master critical config
 =====
int Cable6/0/0
end

```



```

 CMTS subinterface critical config
 =====
int Cable6/0/0
end

 Non Critical config
 =====
int Cable6/0/0
!
no ip address
no keepalive
cable bundle 1
end

Member 5 standby
target ip address: protect 222.1.1.9, working 222.1.1.9
channel-switch "uc" (wavecom-hd, 1.10.45.11/7, 1.10.45.11/4) enabled
channel-switch "rfsw" (rfswitch-group, 1.10.52.33/0x40100000/8) enabled
tran #: SYNC 0, last SYNC_ACK 9
hold timer expires in 00:00:13.756
Interface Generic Critical Config
=====
int Cable6/0/0
mac-address 00e0.6666.1270
end

 CMTS interface pre-critical config
 =====
int Cable5/0/0
cable downstream annex B
cable downstream modulation 256qam
cable downstream interleave-depth 32
end

 CMTS interface critical config
 =====
int Cable6/0/0
cable bundle 1 master
cable downstream annex B
cable downstream modulation 64qam
cable downstream interleave-depth 32
cable downstream frequency 441000000
cable downstream channel-id 60
cable upstream 0 frequency 11408000
cable upstream 0 power-level 0
cable upstream 0 channel-width 1600000
cable upstream 0 minislot-size 4
cable upstream 0 modulation-profile 1
no cable upstream 0 shutdown
cable upstream 1 power-level 0
cable upstream 1 channel-width 1600000
cable upstream 1 minislot-size 4
cable upstream 1 modulation-profile 1
cable upstream 1 shutdown
cable upstream 2 power-level 0
cable upstream 2 channel-width 1600000
cable upstream 2 minislot-size 4
cable upstream 2 modulation-profile 1
cable upstream 2 shutdown
cable upstream 3 power-level 0
cable upstream 3 channel-width 1600000
cable upstream 3 minislot-size 4
cable upstream 3 modulation-profile 1
cable upstream 3 shutdown

```

```

end

 Generic sub-interface master critical config
 =====
int Cable6/0/0
 ip address 12.1.1.1 255.255.255.0 secondary
 ip address 1.6.1.65 255.255.255.0
end

 CMTS subinterface critical config
 =====
int Cable6/0/0
end

 Non Critical config
 =====
int Cable6/0/0
!
end

 Generic sub-interface master critical config
 =====
int Cable6/0/0
end

 CMTS subinterface critical config
 =====
int Cable6/0/0
end

 Non Critical config
 =====
int Cable6/0/0
!
 no ip address
 no keepalive
end

Router#

```

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

The following example shows a detailed display for the Cisco uBR10-MC5X20S cable interface line card:

```

Router# show hccp detail

 mac-address 0005.00e4.1236
cmts config:
 resolve sid, dci-response success,
 downstream - frequency 441000000, channel id 0
 downstream - insertion_invl auto min = 60, max = 480
 downstream - rf-shutdown, rf-power 48
 upstream 0 - frequency 11408000, power level 0
 upstream 0 - modulation-profile 1, channel-width 3200000
 upstream 0 - cnr-profile1 25, cnr-profile2 15
 corr-fec 1, uncorr-fec 1

```

**Note**

For cable interfaces with an integrated upconverter, the line showing the RF power will show **rf-shutdown** when the upconverter has been powered off.

**Related Commands**

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |
| <b>show hccp linecard</b>  | Displays line card-level HCCP information.                                                                                           |
| <b>show hccp group</b>     | Displays group information.                                                                                                          |

# show hccp channel-switch

To display channel-switch hccp information, use the **show hccp channel-switch** command in privileged EXEC mode.

**show hccp channel-switch** [**command-history local** | **counter** | **image** | **state** | **version**]

|                    |                              |                                                        |
|--------------------|------------------------------|--------------------------------------------------------|
| Syntax Description | <b>command-history local</b> | Displays the command history on the Cisco CMTS router. |
|                    | <b>counter</b>               | Displays the counters on the Cisco NGRFSW-ADV.         |
|                    | <b>image</b>                 | Displays the image list on the Cisco NGRFSW-ADV.       |
|                    | <b>state</b>                 | Displays the current state of the Cisco NGRFSW-ADV.    |
|                    | <b>version</b>               | Displays the version of the Cisco NGRFSW-ADV.          |

Command Default      None

Command Modes      Privileged EXEC (#)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCG    | This command was introduced. |

**Examples**      The following example is a sample output of the **show hccp channel-switch command-history local** command showing the command history output.

```
Router# show hccp channel-switch command-history local

timestamp state command
2010-06-13 07:47:17 Succ type:FILE_OPEN, slot:1, group:0x00
2010-06-13 07:47:27 Succ type:FILE_CLOSE, slot:0, group:0x00
2010-06-13 07:48:11 Succ type:FILE_OPEN, slot:2, group:0x00
2010-06-13 07:48:51 Fail type:FILE_CLOSE, slot:0, group:0x00
2010-06-13 09:46:01 Succ type:RESET_SLOT, slot:7, group:0x1F
2010-06-13 09:48:17 Succ type:RESET_SLOT, slot:7, group:0x1F
2010-06-13 18:47:23 Succ type:RESET_SLOT, slot:4, group:0x1F
```

The following example is a sample output of the **show hccp channel-switch counter** command showing the counter statistics.

```
Router# show hccp channel-switch counter

The counter of switchover for all slot/group in rf switch.
slot id group 1 group 2 group 3 group 4 group 5
0 16491 16491 16491 16491 16491
1 2383 2383 2383 2383 2383
2 2360 2360 2360 2360 2360
3 2351 2351 2351 2351 2351
4 2348 2348 2348 2348 2348
5 2343 2343 2343 2343 2343
```

```

6 2354 2354 2354 2354 2354
7 2352 2352 2352 2352 2352

```

The following example is a sample output of the show hccp channel-switch image command showing the image information.

Router# **show hccp channel-switch image**

| file size | file mode | file state | file name |
|-----------|-----------|------------|-----------|
| 6402      | Write     |            | asv3.0    |
| 47246     | Write     |            | acv3.0    |
| 6406      | Read      | Active     | gsv3.0    |
| 47238     | Read      | Active     | gcv3.0    |

The following example is a sample output of the show hccp channel-switch state command showing the state information.

Router# **show hccp channel-switch state**

Current State: RFSW Ready  
Current Protected Slot: 7

The switchcard information in RFSW:

| Slot | Id | Module Id | Type       | HCCP Conf | State         |
|------|----|-----------|------------|-----------|---------------|
| 0    | 12 |           | Upstream   | Yes       | Protecting    |
| 0    | 11 |           | Upstream   | Yes       | Protecting    |
| 0    | 10 |           | Downstream | Yes       | Protecting    |
| 1    | 1  |           | Upstream   | Yes       | Normal        |
| 1    | 2  |           | Upstream   | Yes       | Normal        |
| 1    | 3  |           | Downstream | Yes       | Normal        |
| 2    | 4  |           | Upstream   | Yes       | Normal        |
| 2    | 5  |           | Upstream   | Yes       | Normal        |
| 2    | 6  |           | Downstream | Yes       | Normal        |
| 3    | 7  |           | Upstream   | Yes       | Normal        |
| 3    | 8  |           | Upstream   | Yes       | Normal        |
| 3    | 9  |           | Downstream | Yes       | Normal        |
| 4    | 13 |           | Upstream   | Yes       | Normal        |
| 4    | 14 |           | Upstream   | Yes       | Normal        |
| 4    | 15 |           | Downstream | Yes       | Normal        |
| 5    | 16 |           | Upstream   | Yes       | Normal        |
| 5    | 17 |           | Upstream   | Yes       | Normal        |
| 5    | 18 |           | Downstream | Yes       | Normal        |
| 6    | 19 |           | Upstream   | Yes       | Normal        |
| 6    | 20 |           | Upstream   | Yes       | Normal        |
| 6    | 21 |           | Downstream | Yes       | Normal        |
| 7    | 22 |           | Upstream   | Yes       | In Protecting |
| 7    | 23 |           | Upstream   | Yes       | In Protecting |
| 7    | 24 |           | Downstream | Yes       | In Protecting |

Failed Message Number: 21  
Hello Message Interval: 3 seconds  
AUXRFSW poll state: Succ

The following example is a sample output of the show hccp channel-switch version command showing the version information.

Router# **show hccp channel-switch version**

Controller:

Controller Golden Firmware: gcv3.0, Controller Alternate Firmware:acv3.0  
Switch Golden Firmware: gsv3.0, Switch Alternate Firmware:asv3.0

| Ctrl    | Switch  | Bootload | Watchdog | Temperature | Voltage    | Uptime | Serial      |
|---------|---------|----------|----------|-------------|------------|--------|-------------|
| Version | Version | Version  | Error    |             | Monitoring |        |             |
| 3.0     | 3.0     | 3.0      | 255      | 33          | 12.2V      | 46:21  | AFL15448001 |

## show hccp channel-switch

## SwitchCards:

| Type        | Slot    | Bootload | TotalPower | Relay       | Coil Fail   | Tempe | TotalRelay | Uptime | Serial |
|-------------|---------|----------|------------|-------------|-------------|-------|------------|--------|--------|
| id          | Version | Cycle    | pos        | Register    | rature      | Cycle |            |        |        |
| U0          | 0       | 1.2      | 247        | -----RSRRSR | -----PPPPPP | 0     | 4457       | 0d0h   |        |
| AFL15515020 |         |          |            |             |             |       |            |        |        |
| U10         | 0       | 1.2      | 247        | -----RSRRSR | -----PPPPPP | 0     | 4420       | 0d0h   |        |
| AFL15515013 |         |          |            |             |             |       |            |        |        |
| DS          | 0       | 1.2      | 250        | -----RRRSSR | -----PPPPPP | 0     | 7533       | 0d0h   |        |
| AFL15512017 |         |          |            |             |             |       |            |        |        |
| U0          | 1       | 1.2      | 340        | SSSSS-SSSSS | PPPPP-PPPPP | 33    | 2472       | 0d0h   |        |
| AFL15514160 |         |          |            |             |             |       |            |        |        |
| U10         | 1       | 1.2      | 240        | SSSSS-SSSSS | PPPPP-PPPPP | 33    | 2352       | 0d0h   |        |
| AFL15514163 |         |          |            |             |             |       |            |        |        |
| DS          | 1       | 1.2      | 265        | -----RRRRR  | -----PPPPP  | 33    | 2382       | 0d0h   |        |
| AFL15491025 |         |          |            |             |             |       |            |        |        |
| U0          | 2       | 1.2      | 249        | SSSSS-SSSSS | PPPPP-PPPPP | 34    | 2339       | 0d0h   |        |
| AFL15514236 |         |          |            |             |             |       |            |        |        |
| U10         | 2       | 1.2      | 257        | SSSSS-SSSSS | PPPPP-PPPPP | 34    | 2340       | 0d0h   |        |
| AFL15514223 |         |          |            |             |             |       |            |        |        |
| DS          | 2       | 1.2      | 254        | -----RRRRR  | -----PPPPP  | 34    | 2361       | 0d0h   |        |
| AFL15431001 |         |          |            |             |             |       |            |        |        |
| U0          | 3       | 1.2      | 262        | SSSSS-SSSSS | PPPPP-PPPPP | 35    | 2315       | 0d0h   |        |
| AFL15514214 |         |          |            |             |             |       |            |        |        |
| U10         | 3       | 1.2      | 255        | SSSSS-SSSSS | PPPPP-PPPPP | 36    | 2316       | 0d0h   |        |
| AFL15514215 |         |          |            |             |             |       |            |        |        |
| DS          | 3       | 1.2      | 251        | -----RRRRR  | -----PPPPP  | 34    | 2313       | 0d0h   |        |
| AFL15491078 |         |          |            |             |             |       |            |        |        |
| U0          | 4       | 1.2      | 237        | SSSSS-SSSSS | PPPPP-PPPPP | 35    | 2324       | 0d0h   |        |
| AFL15514213 |         |          |            |             |             |       |            |        |        |
| U10         | 4       | 1.2      | 255        | SSSSS-SSSSS | PPPPP-PPPPP | 35    | 2314       | 0d0h   |        |
| AFL15514221 |         |          |            |             |             |       |            |        |        |
| DS          | 4       | 1.2      | 245        | -----RRRRR  | -----PPPPP  | 37    | 2326       | 0d0h   |        |
| AFL15491092 |         |          |            |             |             |       |            |        |        |
| U0          | 5       | 1.2      | 236        | SSSSS-SSSSS | PPPPP-PPPPP | 35    | 2281       | 0d0h   |        |
| AFL15514212 |         |          |            |             |             |       |            |        |        |
| U10         | 5       | 1.2      | 279        | SSSSS-SSSSS | PPPPP-PPPPP | 34    | 2333       | 0d0h   |        |
| AFL15514228 |         |          |            |             |             |       |            |        |        |
| DS          | 5       | 1.2      | 247        | -----RRRRR  | -----PPPPP  | 34    | 2315       | 0d0h   |        |
| AFL15491064 |         |          |            |             |             |       |            |        |        |
| U0          | 6       | 1.2      | 256        | SSSSS-SSSSS | PPPPP-PPPPP | 33    | 2333       | 0d0h   |        |
| AFL15514224 |         |          |            |             |             |       |            |        |        |
| U10         | 6       | 1.2      | 258        | SSSSS-SSSSS | PPPPP-PPPPP | 34    | 2314       | 0d0h   |        |
| AFL15514230 |         |          |            |             |             |       |            |        |        |
| DS          | 6       | 1.2      | 268        | -----RRRRR  | -----PPPPP  | 33    | 2310       | 0d0h   |        |
| AFL15491044 |         |          |            |             |             |       |            |        |        |
| U0          | 7       | 1.2      | 293        | RRRRR-RRRRR | PPPPP-PPPPP | 33    | 2369       | 0d0h   |        |
| AFL15514227 |         |          |            |             |             |       |            |        |        |
| U10         | 7       | 1.2      | 325        | RRRRR-RRRRR | PPPPP-PPPPP | 33    | 2403       | 0d0h   |        |
| AFL15514235 |         |          |            |             |             |       |            |        |        |
| DS          | 7       | 1.2      | 315        | -----SSSSS  | -----PPPPP  | 33    | 2383       | 0d0h   |        |
| AFL15491108 |         |          |            |             |             |       |            |        |        |

Table 206 describes the significant fields shown in the display.

**Table 206** *show hccp channel-switch Field Descriptions*

| Field              | Description                                                                                                                                                       |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| timestamp          | Time at which a command was executed.                                                                                                                             |
| State              | State of the switch card.                                                                                                                                         |
| command            | List of commands executed on the Cisco CMTS router.                                                                                                               |
| Module Id          | Switchover module identifier in the Cisco NGRFSW-ADV.                                                                                                             |
| Ctrl Version       | Version of the Controller.                                                                                                                                        |
| Switch Version     | Version of the Switch.                                                                                                                                            |
| Bootload Version   | Version of the bootload in the Cisco NGRFSW-ADV.                                                                                                                  |
| Watchdog Error     | Watchdog error number.                                                                                                                                            |
| Temperature        | Temperature of the switch card.                                                                                                                                   |
| Voltage Monitoring | Voltage value.                                                                                                                                                    |
| Uptime             | Uptime of the switch card.                                                                                                                                        |
| Serial             | Serial string for the controller and switchover cards.                                                                                                            |
| Type               | Type of the switch card (upstream or downstream).                                                                                                                 |
| Slot ID            | Slot number of the switch card.                                                                                                                                   |
| TotalPower Cycle   | Power cycle number for the switchover card.                                                                                                                       |
| Relay pos          | Relay position register. It is a 11-bit value, where 's' represents a set bit, 'R' represents a reset bit, and '-' is for an unused bit.                          |
| Coil Fail Register | Coil failure register in the switchover cards. It is a 11-bit value, where 'P' represents a normal bit, 'F' represents a failed bit and '-' is for an unused bit. |
| TotalRelay Cycle   | Relay cycle number for the switchover card.                                                                                                                       |

#### Related Commands

| Command          | Description                                                                |
|------------------|----------------------------------------------------------------------------|
| <b>show hccp</b> | Displays Hot Standby Connection-to-Connection Protocol (HCCP) information. |

# show hccp interface

To display information on all Hot Standby Connection-to-Connection Protocol (HCCP) groups associated with a specific cable interface, use the **show hccp interface** command in user EXEC or privileged EXEC mode.

```
show hccp interface interface [brief | detail]
```

|                    |           |                                                                                                                                                                                                                                                                                                                                         |
|--------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | interface | The cable interface for which you want to display HCCP group information. The information presented includes HCCP groups, configuration types, member numbers, status, authentication algorithms, authentication key chains, HCCP timers, Ip address assignments, and downstream switch designations for the specified cable interface. |
|                    | brief     | (Option) Displays a brief summary of the HCCP groups, configuration types, member numbers, and status for a specified cable interface.                                                                                                                                                                                                  |
|                    | detail    | (Option) Displays a detailed summary of the HCCP groups, configuration types, member numbers, and status for a specified cable interface.                                                                                                                                                                                               |

|               |                            |
|---------------|----------------------------|
| Command Modes | User EXEC, Privileged EXEC |
|---------------|----------------------------|

|                 |             |                                                                                                                                                 |
|-----------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Command History | Release     | Modification                                                                                                                                    |
|                 | 12.1(3a)EC  | This command was introduced.                                                                                                                    |
|                 | 12.2(4)BC1  | The <b>detail</b> option was added.                                                                                                             |
|                 | 12.2(8)BC2  | The current time to resync and current wait to restore was added to the <b>brief</b> option.                                                    |
|                 | 12.2(11)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards. |

Examples

The following examples are from the **show hccp interface cable 4/0** and **show hccp interface cable 4/0 brief** commands:

```
Router# show hccp interface cable 4/0

Cable4/0 - Group 1 Protect, enabled, blocking
authentication md5, key-chain "cisco1"
hello time 2000 msec, hold time 6000 msec
Member 1 standby
ip addr: working 10.20.111.11, protect 10.20.111.10
downstream wavecom (1.1.11.3/1, 1.1.11.3/2), upstream none

Router# show hccp interface cable 4/0 brief

Interface Config Grp Mbr Status
Ca4/0 Protect 1 1 standby

Router#
```



In Cisco IOS Release 12.2(8)BC2 and later 12.2 BC releases, the **brief** option also shows the amount of time left before the next resynchronization and the time left before a restore:

Router# **show hccp interface cable 4/0 brief**

| Interface | Config  | Grp | Mbr | Status  | WaitToResync | WaitToRestore |
|-----------|---------|-----|-----|---------|--------------|---------------|
| Ca4/0     | Protect | 1   | 1   | standby | 00:00:50.892 | 00:01:50.892  |

Router#



Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

Related Commands

| Command          | Description                                                                                                                   |
|------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>show hccp</b> | Displays information for all cable interfaces on which one or more HCCP groups and authentication modes have been configured. |

# show hccp group

To display information about groups associated with cable interfaces, use the **show hccp group** command in user EXEC or privileged EXEC mode.

**show hccp group member** { **CGD** | *mac-address* { **classifier** | **l2vpn** } | **channel-switch** | **detail** | **event-history** | **host** [**ipv6**] | **mcast sid** | **mlist** | **modem** [**ipv6**] | **multicast-session** | **qosparam** | **service-flow** [*sfid* [**classifier**]] | **sid** }

## Syntax Description

|                                                   |                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group</i>                                      | (Optional) Specifies a group number to be displayed. The valid range is from 1 to 255.                                                                                                                                                                                                                                                            |
| <i>member</i>                                     | (Optional, when displaying information for a particular group) Specifies the member ID of the Inter-database for the specified group. Each <i>member</i> denotes a working line card. For example, 50 is the member ID for slot 5/0, 51 is the member ID for slot 5/1, 81 is the member ID for slot 8/1.<br><br>The valid range is from 1 to 255. |
| <b>CGD</b>                                        | (Optional) Displays the channel group domain (CGD) information synchronized from the active line card to the standby line card. This information is saved in the Inter-database on the standby line card.                                                                                                                                         |
| <i>mac-address</i> <b>classifier</b>              | (Optional) Displays classifier information for the specified MAC address.                                                                                                                                                                                                                                                                         |
| <i>mac-address</i> <b>l2vpn</b>                   | (Optional) Displays l2vpn information for the specified MAC address.                                                                                                                                                                                                                                                                              |
| <b>channel-switch</b>                             | (Optional) Displays channel-switch information for this particular group and member.                                                                                                                                                                                                                                                              |
| <b>detail</b>                                     | (Optional) Displays a detailed summary of the groups, configuration types, member numbers, and status for cable interfaces, as well as the CLI commands that are being synchronized across interfaces.                                                                                                                                            |
| <b>event-history</b>                              | (Optional) Displays HCCP event history information.                                                                                                                                                                                                                                                                                               |
| <b>host</b>                                       | (Optional) Displays host information for this particular group and member.                                                                                                                                                                                                                                                                        |
| <b>mcast sid</b>                                  | (Optional) Displays the modular or integrated cable interface multicast service ID (SID) information synchronized from the active line card to the standby line card. This information is saved in the Inter-database on the standby line card.                                                                                                   |
| <b>mlist</b>                                      | (Optional) Displays ACL-MSAID information.                                                                                                                                                                                                                                                                                                        |
| <b>modem</b>                                      | (Optional) Displays cable modem information for this particular group and member.                                                                                                                                                                                                                                                                 |
| <b>multicast-session</b>                          | (Optional) Displays multicast session information.                                                                                                                                                                                                                                                                                                |
| <b>qosparam</b>                                   | (Optional) Displays quality of service (QoS) parameter information for this particular group and member.                                                                                                                                                                                                                                          |
| <b>service-flow</b> <i>sfid</i> <b>classifier</b> | (Optional) Displays service flow and classifier information for the specified service flow ID (SFID) for this particular group and member.                                                                                                                                                                                                        |
| <b>sid</b>                                        | (Optional) Displays service ID (SID) information for this particular group and member.                                                                                                                                                                                                                                                            |

## Command Modes

User EXEC, Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                                                            |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC  | This command was introduced.                                                                                                                                                                                            |
| 12.2(4)BC1  | The <b>detail</b> option was added.                                                                                                                                                                                     |
| 12.2(8)BC2  | The current time to resync and current wait to restore values were added to the display for the <b>brief</b> option.                                                                                                    |
| 12.2(11)BC1 | Support was added for the Cisco uBR-RFSW N+1 (1:n) RF Switch with the Cisco uBR7246VXR router and Cisco uBR-MC16C, Cisco uBR-MC16S, and Cisco uBR-MC28C cards.                                                          |
| 12.2(15)BC2 | The output of the <b>show hccp detail</b> command was changed to show separate lists of the critical and non-critical CLI commands that are being synchronized for each Working and Protect interface and subinterface. |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB and the output of the <b>show hccp detail</b> command was changed to show CMTS interface pre-critical config information.                                |
| 12.2(33)SCC | This command was integrated into Cisco IOS Release 12.2(33)SCC.                                                                                                                                                         |

## Examples

The following shows an example of the **show hccp** command to display QoS parameters for a particular member of a particular group:

```
Router# show hccp 1 1 qosparam
```

```
Cable5/0/0:
```

| Index | Name | Dir | Sched | Prio | MaxSusRate | MaxBurst | MinRsvRate |
|-------|------|-----|-------|------|------------|----------|------------|
| 1     |      | US  | BE    | 0    | 64000      | 0        | 0          |
| 2     |      | DS  | BE    | 0    | 1000000    | 0        | 0          |
| 3     |      | US  | BE    | 7    | 1024000    | 1522     | 0          |
| 4     |      | DS  | BE    | 0    | 10000000   | 1522     | 0          |

```
Router#
```



## Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

The following example shows the service flow information for a cable interface line card on group 2 member 50:

```
Router# show hccp 2 50 service-flow
```

```
Cable8/0/1[grp:2, mem:50, P]:[HCCP inter-db: service flow]
```

| Sfid | Sid | Mac Address    | QoS Param |     |     | Index | Type | Dir | Curr State |
|------|-----|----------------|-----------|-----|-----|-------|------|-----|------------|
|      |     |                | Prov      | Adm | Act |       |      |     |            |
| 8    | N/A | 001a.c3ff.d198 | 6         | 6   | 6   | P     | DS   | act |            |
| 7    | 1   | 001a.c3ff.d198 | 4         | 4   | 4   | P     | US   | act |            |
| 16   | 9   | 001a.c3ff.d198 | 5         | 5   | 5   | S(s)  | US   | act |            |
| 10   | N/A | 001a.c3ff.d59e | 6         | 6   | 6   | P     | DS   | act |            |
| 9    | 2   | 001a.c3ff.d59e | 4         | 4   | 4   | P     | US   | act |            |
| 15   | 6   | 001a.c3ff.d59e | 5         | 5   | 5   | S(s)  | US   | act |            |
| 14   | N/A | 001a.c3ff.d6a8 | 6         | 6   | 6   | P     | DS   | act |            |
| 13   | 4   | 001a.c3ff.d6a8 | 4         | 4   | 4   | P     | US   | act |            |
| 17   | 12  | 001a.c3ff.d6a8 | 5         | 5   | 5   | S(s)  | US   | act |            |
| 19   | N/A | 0019.474a.d592 | 6         | 6   | 6   | P     | DS   | act |            |
| 18   | 14  | 0019.474a.d592 | 4         | 4   | 4   | P     | US   | act |            |
| 20   | 15  | 0019.474a.d592 | 5         | 5   | 5   | S(s)  | US   | act |            |
| 12   | N/A | 001e.6bfa.f5bc | 6         | 6   | 6   | P     | DS   | act |            |

show hccp group

```
11 3 001e.6bfa.f5bc 4 4 4 P US act
21 17 001e.6bfa.f5bc 5 5 5 S(s) US act
```

The following example shows the cable modem information for a cable interface line card on group 2 member 50:

Router# **show hccp 2 50 modem**

```
Cable8/0/1[grp:2, mem:50, P]:[HCCP inter-db: CM]
MAC Address IP Address MAC Prim Timing Num BPI Prio
 State Sid Offset CPEs Enbld
001a.c3ff.d198 10.10.2.1 w-online 1 1978 0 no Data(0)
001a.c3ff.d59e 10.10.2.2 w-online 2 1978 0 no Data(0)
001a.c3ff.d6a8 10.10.2.3 w-online 4 1978 0 no Data(5)
0019.474a.d592 10.10.2.4 w-online 14 1576 0 no Data(1)
001e.6bfa.f5bc 10.10.2.5 w-online 3 1976 0 no Data(5)
```

Related Commands

| Command             | Description                                                                                                                          |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| show hccp           | Displays HCCP group information for a specific cable interface.                                                                      |
| show hccp interface | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# show hccp linecard

To display information about groups associated with cable interfaces, use the **show hccp linecard** command in user EXEC or privileged EXEC mode.

```
show hccp linecard {brief | channel-switch | detail | fsm | nullfsm | subslot slot/subslot
 {channel-switch | detail | modem summary total}}
```

## Syntax Description

|                             |                                                                                                                                                                                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>brief</b>                | (Optional) Displays a brief summary of HCCP for each line card.                                                                                                                  |
| <b>channel-switch</b>       | (Optional) Displays channel-switch information for each line card.                                                                                                               |
| <b>detail</b>               | (Optional) Displays a detailed summary of HCCP for each line card.                                                                                                               |
| <b>fsm</b>                  | (Optional) Displays the complete state transition flow. Each line card member in an HCCP group is controlled by a state machine, which controls the startup and switchover flow. |
| <b>nullfsm</b>              | (Optional) Displays the HCCP members that received unused or nonmeaningful event. This is used only for debugging.                                                               |
| <b>subslot slot/subslot</b> | (Optional) Specifies the subslot for the line card.                                                                                                                              |
| <b>channel-switch</b>       | (Optional) Displays line card-level channel switch summary.                                                                                                                      |
| <b>detail</b>               | (Optional) Displays details of the line card-level HCCP.                                                                                                                         |
| <b>modem summary total</b>  | (Optional) Displays modem information.                                                                                                                                           |

## Command Default

None.

## Command Modes

User EXEC, Privileged EXEC (#)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCE | This command was introduced. |

## Usage Guidelines

The **show hccp linecard subslot slot/subslot modem summary total** command is used to show the modem summary information in the peer Inter-database and to check if the modem has successfully synchronized with the standby.

## Examples

This example shows the **brief** and **fsm** information for a cable interface line card:

```
Router# show hccp linecard brief
```

|          |         |     |         |              |              |               |
|----------|---------|-----|---------|--------------|--------------|---------------|
| Card     | Config  | Mbr | Role    | State        | WaitToResync | WaitToRestore |
| card 5/1 | Protect | 50  | Standby | Standby Warm | never        |               |
| card 5/0 | Working | 50  | Active  | Active Warm  | never        |               |

```
Router# show hccp linecard fsm
```

## ■ show hccp linecard

```

Oct 26 2010 10:46:32 - Slot(5/0) Member(50): (Active Sync) + < Staticsync Done > --> (
Active Warm) : (ACTIVE MD:0x7F)
Oct 26 2010 10:46:32 - Slot(5/1) Member(50): (Standby) + < Staticsync Done > --> (
Standby Warm) : (ACTIVE MD:0x7F)
Oct 26 2010 10:46:29 - Slot(5/0) Member(50): (Active) + < Do Staticsync > --> (
Active Sync) : (ACTIVE MD:0x7F)
Oct 26 2010 10:45:59 - Slot(5/1) Member(50): (Standby) + < Data Plane Ready > --> (
Standby) : (ACTIVE MD:0x7F)
Oct 26 2010 10:45:59 - Slot(5/1) Member(50): (Standby) + < Post Become Stdbdy> --> (
Standby) : (ACTIVE MD:0x7F)
Oct 26 2010 10:45:59 - Slot(5/0) Member(50): (Active Crit) + < Data Plane Ready > --> (
Active) : (ACTIVE MD:0x7F)
Oct 26 2010 10:45:59 - Slot(5/1) Member(50): (Standby Ready) + < Become Standby > --> (
Standby) : (ACTIVE MD:0x7F)
Oct 26 2010 10:45:59 - Slot(5/1) Member(50): (Standby Cold) + < Prepare > --> (Standby
Ready) : (ACTIVE MD:0x7F)
Oct 26 2010 10:45:57 - Slot(5/1) Member(50): (Init) + < LC UP > --> (Standby
Cold) : (ACTIVE MD:0x7F)
Oct 26 2010 10:45:57 - Slot(5/0) Member(50): (Active Ready) + < Become Active > --> (
Active Crit) : (ACTIVE MD:0x7F)
Oct 26 2010 10:45:57 - Slot(5/0) Member(50): (Active Cold) + < Prepare > --> (Active
Ready) : (ACTIVE MD:0x7F)
Oct 26 2010 10:45:57 - Slot(5/0) Member(50): (Init) + < LC UP > --> (Active
Cold) : (ACTIVE MD:0x7F)

```

## Related Commands

| Command                    | Description                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>show hccp</b>           | Displays HCCP group information for a specific cable interface.                                                                      |
| <b>show hccp interface</b> | Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured. |

# show hw-module bay

To display information about the wideband channels or RF channels on a Wideband SPA, use the **show hw-module bay** command in privileged EXEC mode.

**Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA**

```
show hw-module bay {slot/subslot/bay | all} show-type
 {wideband-channel | rf-channel | modular-channel} [device-index] [verbose]
```

**Cisco IOS Release 12.2(33)SCB**

```
show hw-module bay {slot/bay/port | all} show-type
 {wideband-channel | rf-channel | modular-channel} [device-index] [verbose]
```

| Syntax Description      |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>             |  | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs.                                                                                                                                                                                                                                                                                                                                                                               |
| <i>subslot</i>          |  | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>bay</i>              |  | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>port</i>             |  | Specifies the interface number on the SPA.                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>all</b>              |  | Specifies that the displayed information will be for both bay 1 and bay 0 if Wideband SPAs are installed in both bays.                                                                                                                                                                                                                                                                                                                                                        |
| <i>show-type</i>        |  | The type of information to display. Valid values are <b>association</b> , <b>config</b> , <b>counters</b> , and <b>mapping</b> . See the Usage Guidelines for more information on show types.                                                                                                                                                                                                                                                                                 |
| <b>wideband-channel</b> |  | Displays information for the wideband channel indicated by <i>device-index</i> .                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>rf-channel</b>       |  | Displays information for the RF channel indicated by <i>device-index</i> .                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>modular-channel</b>  |  | Displays information for the narrowband channel indicated by <i>device-index</i> .                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>device-index</i>     |  | (Optional) The wideband channel number or RF channel number or Baseline Privacy Interface (BPI) index number. <ul style="list-style-type: none"> <li>When the <b>wideband-channel</b> keyword is specified, valid values for <i>device-index</i> are 0 to 11.</li> <li>When the <b>rf-channel</b> keyword is specified, valid values for <i>device-index</i> are 0 to 23 depending on how the Wideband SPA is configured with the <b>annex modulation</b> command.</li> </ul> |
| <b>verbose</b>          |  | (Optional) Used with the <b>config</b> keyword. Shows more configuration information on the wideband channel or RF channel.                                                                                                                                                                                                                                                                                                                                                   |

**Command Default** No default values or behavior

**Command Modes** Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                  |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                    |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                               |
| 12.3(23)BC  | The <b>modular-channel</b> keyword was added. MC BW % column was added to the rf-channel keyword output.                                                                                      |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB.<br>This command was modified to change the addressing format for a SPA from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

**Usage Guidelines**

The type of information that **show hw-module bay** displays is determined by the value of the *show-type* argument. Table 0-1 describes the information shown for each *show-type*. In the table, the Allowed with Keyword column indicates whether the *show-type* can be used with the keyword wideband-channel, rf-channel or modular-channel.

If *device-index* is omitted from **show hw-module bay**, the command displays information for all wideband channels, RF channels, or BPI+ indexes depending on the keywords used.

The **association** *show-type* displays wideband-to-narrowband (traditional DOCSIS) channel association information only when the cable interface line card and Wideband SPA are physically present in the CMTS.

**Note**

- If you do not specify the **verbose** keyword, less detailed configuration information is displayed.
- Changes in Cisco IOS release 12.3(23)BC are not supported in Cisco IOS release 12.2(33)SCA.

**Table 207**      **Values for show-type**

| <i>show-type</i>   | Allowed with Keyword                                                    | Description                                                                                                                                                                                                                                                                           |
|--------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>association</b> | <b>wideband-channel</b>                                                 | Displays wideband-to-narrowband (traditional DOCSIS) channel association information. The association of a wideband channel to a traditional DOCSIS downstream channel is made when a primary downstream channel for the fiber node is configured with the <b>downstream</b> command. |
| <b>config</b>      | <b>wideband-channel</b> or <b>rf-channel</b>                            | Displays wideband channel or RF channel configuration information depending on the keyword specified.                                                                                                                                                                                 |
| <b>counters</b>    | <b>wideband-channel</b> or <b>rf-channel</b>                            | Displays wideband channel or RF channel statistics depending on the keyword specified.                                                                                                                                                                                                |
| <b>mapping</b>     | <b>wideband-channel</b> , <b>rf-channel</b> , or <b>modular-channel</b> | Displays mapping of wideband channels to RF channels depending on the keyword specified.                                                                                                                                                                                              |



For additional information, refer to the following documents on Cisco.com:

- *Cisco Cable Wideband Solution Design and Implementation Guide*, Release 1.0
- *Cisco uBR10012 Universal Broadband Router SIP and SPA Software Configuration Guide*
- *Cisco uBR10012 Universal Broadband Router SIP and SPA Hardware Installation Guide*

## Examples

The following examples display sample output for the **show hw-module bay** command for wideband channel 0 on the Wideband SPA located in slot 1, subslot 0, bay 0:

Router# **show hw-module bay 1/0/0 counters wideband-channel 0**

| SPA   | WB channel | Tx packets | Tx octets |
|-------|------------|------------|-----------|
| 1/0/0 | 0          | 29069      | 4032392   |

Router# **show hw-module bay 1/0/0 mapping wideband-channel 0**

| SPA   | WB channel | RF channel | BW % |
|-------|------------|------------|------|
| 1/0/0 | 0          | 0          | 100  |
|       |            | 1          | 100  |
|       |            | 2          | 100  |
|       |            | 3          | 100  |
|       |            | 4          | 100  |
|       |            | 5          | 100  |
|       |            | 6          | 100  |

Router# **show hw-module bay 1/0/0 association wideband-channel 0**

| WB channel            | BG ID | Bundle num | NB channel | NB chan ID | Reserved CIR | Total CIR |
|-----------------------|-------|------------|------------|------------|--------------|-----------|
| Wideband-Cable1/0/0:0 | 1     | 1          | Cable6/0/0 | 251        | 0            | 42064200  |

The following example shows sample output for the **show hw-module bay** command in Cisco IOS Release 12.3(21)BC:

Router# **show hw-module bay 1/0/0 association wideband-channel 0**

| WB channel            | BG ID | Bundle num | NB channel | NB chan ID | Reserved CIR | Avail CIR |
|-----------------------|-------|------------|------------|------------|--------------|-----------|
| Wideband-Cable1/0/0:0 | 1     | 1          | Cable6/0/0 | 251        | 0            | 0         |

The following example shows sample output for the **show hw-module bay** command in Cisco IOS Release 12.3(23)BC:

Router# **show hw-module bay 1/0/0 association wideband-channel 0**

| WB channel            | BG ID | Bundle num | NB channel | NB chan ID | Reserved CIR | Total CIR |
|-----------------------|-------|------------|------------|------------|--------------|-----------|
| Wideband-Cable1/0/0:0 | 1     | 140        | Cable6/0/0 | 30         | 0            | 42064200  |

Router# **show hw-module bay 3/0/0 mapping rf-channel**

| SPA   | RF channel | MC BW % | WB channel | WB BW % |
|-------|------------|---------|------------|---------|
| 3/0/0 | 0          | 2       | 0          | 90      |
|       |            |         | 1          | 2       |
| 3/0/0 | 1          | 2       | 0          | 90      |
|       |            |         | 1          | 2       |
| 3/0/0 | 3          | 0       | 3          | 50      |
| 3/0/0 | 4          | 0       | 3          | 100     |

In the preceding example, the following information is displayed for each wideband channel when the **association** keyword is specified.

- WB channel—Wideband-cable interface (wideband channel).
- BG ID—Bonding Group ID for the wideband channel.
- MC BW %—Percentage of rf-channel bandwidth assigned to the corresponding modular-cable interface.
- Bundle num—The number of the virtual bundle interface in which the wideband channel is a member.
- NB channel—The slot/subslot/port of the primary downstream channel (narrowband channel or traditional DOCSIS channel) for the wideband channel.
- NB channel ID—Channel ID for the primary downstream channel.
- Reserved CIR—The reserved committed information rate (CIR).
- Total CIR—The total CIR that is available.

**Note**

For Cisco IOS Release 12.3(21)BC, the descriptions for the Reserved CIR and Available CIR fields are as follows:

Reserved CIR—The reserved committed information rate (CIR). Because QoS is currently best effort for wideband traffic, reserved CIR is always 0.

Avail CIR—The part of the CIR that is available. Because QoS is currently best effort for wideband traffic, available CIR is always 0.

The following examples display **show hw-module bay** command output for wideband channels (0 to 11) on the Wideband SPA located in slot 1, subslot 0, bay 0:

Router# **show hw-module bay 1/0/0 counters wideband-channel**

| SPA   | WB channel | Tx packets | Tx octets |
|-------|------------|------------|-----------|
| 1/0/0 | 0          | 395        | 31590     |
| 1/0/0 | 1          | 0          | 0         |
| 1/0/0 | 2          | 0          | 0         |
| 1/0/0 | 3          | 0          | 0         |
| 1/0/0 | 4          | 0          | 0         |
| 1/0/0 | 5          | 0          | 0         |
| 1/0/0 | 6          | 0          | 0         |
| 1/0/0 | 7          | 0          | 0         |
| 1/0/0 | 8          | 0          | 0         |
| 1/0/0 | 9          | 0          | 0         |
| 1/0/0 | 10         | 0          | 0         |
| 1/0/0 | 11         | 0          | 0         |

Router# **show hw-module bay 1/0/0 config wideband-channel**

| WB channel             | BG ID | Bundle num | WB Host Slot/Subslot | Primary BG |
|------------------------|-------|------------|----------------------|------------|
| Wideband-Cable1/0/0:0  | 24    | 123        | 5/0                  | Yes        |
| Wideband-Cable1/0/0:1  | 25    | 123        | 5/0                  | Yes        |
| Wideband-Cable1/0/0:2  | 26    | 123        | 5/0                  | Yes        |
| Wideband-Cable1/0/0:3  | 27    | 123        | 5/0                  | Yes        |
| Wideband-Cable1/0/0:4  | 28    | 123        | 5/0                  | Yes        |
| Wideband-Cable1/0/0:5  | 29    | 123        | 5/0                  | Yes        |
| Wideband-Cable1/0/0:6  | 30    | 123        | 5/0                  | Yes        |
| Wideband-Cable1/0/0:7  | 31    | 123        | 5/0                  | Yes        |
| Wideband-Cable1/0/0:8  | 32    | 0          | 5/0                  | Yes        |
| Wideband-Cable1/0/0:9  | 33    | 0          | 5/0                  | Yes        |
| Wideband-Cable1/0/0:10 | 34    | 0          | 5/0                  | Yes        |

In the preceding example, the following information is displayed for each wideband channel when the **config** keyword is specified.

- **WB Channel**—Specifies the wideband channel slot, sub-slot, bay and wideband channel number.
- **BG ID**—Bonding Group ID.
- **Bundle num**—The number of the virtual bundle interface to which the wideband channel is a member.
- **WB Host Slot/Subslot**—The cable interface line card that has been configured for Wideband protocol operations. See the command **modular-host**.
- **Primary BG**—Yes indicates that the wideband channel is a primary bonding group (primary wideband channel).

The following examples display **show hw-module bay** command output for RF channel 0 on the Wideband SPA located in slot 1, subslot 0, bay 0:

```
Router# show hw-module bay 1/0/0 config rf-channel 0
```

| SPA   | RF<br>channel | Freq      | Mod   | Annex | IP Address     | MAC Address    | UDP<br>port |
|-------|---------------|-----------|-------|-------|----------------|----------------|-------------|
| 1/0/0 | 0             | 699000000 | 64qam | B     | 192.168.200.30 | 0011.920e.a9ff | 49152       |

In the preceding output, these fields provide information on the edge QAM device that is associated with the RF channel:

- **IP Address**—The IP address of the edge QAM device.
- **MAC address**—The MAC address of the next-hop device or edge QAM device.
- **UDP port**—The UDP port number for the edge QAM device that will be used for this RF channel.

```
Router# show hw-module bay 1/0/0 config rf-channel 0 verbose
```

```
SPA : Wideband-Cable 1/0/0
RF channel number : 0
Frequency : 699000000 Hz
Modulation : 64qam
Annex : B
IP address of next hop : 192.168.200.30
MAC address of EQAM : 000c.3033.2cbf
UDP port number : 49152
EQAM headroom : 0
```

The following example displays the **show hw-module bay counters rf-channel** command output for the RF channels of a Cisco Wideband SPA. Activity is seen on channels 1,2, and 3 as the MPEG Mbps field shows they are each transmitting at about 29 Mbps. Channel 1 is primary-capable as it is transmitting SYNC packets.

```
Router# show hw-module bay 3/3/0 counters rf-channel
```

| SPA   | RF<br>Chan | MPEG<br>Packets Tx | MPEG<br>bps | MPEG<br>Mbps | Sync<br>Packets Tx | MAP<br>Packets Tx |
|-------|------------|--------------------|-------------|--------------|--------------------|-------------------|
| 3/3/0 | 0          | 0                  | 0           | 0.000        | 0                  | 0                 |
| 3/3/0 | 1          | 4612111            | 29755888    | 29.755       | 32042              | 151486            |
| 3/3/0 | 2          | 4536949            | 29720243    | 29.720       | 0                  | 154               |
| 3/3/0 | 3          | 4542709            | 29688759    | 29.688       | 0                  | 154               |
| 3/3/0 | 4          | 0                  | 0           | 0.000        | 0                  | 0                 |
| 3/3/0 | 5          | 0                  | 0           | 0.000        | 0                  | 0                 |
| 3/3/0 | 6          | 0                  | 0           | 0.000        | 0                  | 0                 |
| 3/3/0 | 7          | 0                  | 0           | 0.000        | 0                  | 0                 |
| 3/3/0 | 8          | 0                  | 0           | 0.000        | 0                  | 0                 |

## ■ show hw-module bay

|       |    |   |   |       |   |   |
|-------|----|---|---|-------|---|---|
| 3/3/0 | 9  | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 10 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 11 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 12 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 13 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 14 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 15 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 16 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 17 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 18 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 19 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 20 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 21 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 22 | 0 | 0 | 0.000 | 0 | 0 |
| 3/3/0 | 23 | 0 | 0 | 0.000 | 0 | 0 |

Router# **show hw-module bay 1/0/0 mapping rf-channel 0**

| SPA   | RF<br>channel | WB<br>channel | BW % |
|-------|---------------|---------------|------|
| 1/0/0 | 0             | 0             | 100  |

The following example displays **show hw-module bay** command output for RF channels on the Wideband SPA located at slot 1, subslot 0, bay 0. In the example, the output is for only RF channels 0 to 8 because only those RF channels have been associated with a wideband channel. The BW % column is the percent of the RF channel bandwidth that is assigned to the wideband channel with the **cable rf-channel** command.

Router# **show hw-module bay 1/0/0 mapping rf-channel**

| SPA   | RF<br>channel | WB<br>channel | BW % |
|-------|---------------|---------------|------|
| 1/0/0 | 0             | 0             | 100  |
| 1/0/0 | 1             | 0             | 100  |
| 1/0/0 | 2             | 0             | 100  |
| 1/0/0 | 3             | 0             | 100  |
| 1/0/0 | 4             | 0             | 100  |
| 1/0/0 | 5             | 0             | 100  |
| 1/0/0 | 6             | 0             | 100  |
| 1/0/0 | 7             | 2             | 100  |
| 1/0/0 | 8             | 1             | 100  |

## Related Commands

| Command                       | Description                                        |
|-------------------------------|----------------------------------------------------|
| <b>show hw-module bay oir</b> | Displays the operational status of a Wideband SPA. |

# show hw-module bay oir

To display the operational status of a SPA, use the **show hw-module bay oir** command in privileged EXEC mode.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

```
show hw-module bay {slot/subslot/bay | all} oir [internal]
```

## Cisco IOS Release 12.2(33)SCB

```
show hw-module bay {slot/bay/port | all} oir [internal]
```

| Syntax Description |  |                                                                                                                                                  |
|--------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>        |  | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for a SIP.                                                 |
| <i>subslot</i>     |  | The subslot where the Wideband SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.                                         |
| <i>bay</i>         |  | The bay in the SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).                                                     |
| <i>port</i>        |  | Specifies the interface number on the SPA.                                                                                                       |
| <b>all</b>         |  | Displays OIR status for all Wideband SPAs in the system.                                                                                         |
| <b>internal</b>    |  | (Optional) Displays detailed diagnostic information. This option is intended for internal diagnostic use with Cisco technical support personnel. |

**Command Default** If you do not specify the **internal** keyword, detailed diagnostic information is not displayed.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                               |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                                 |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                            |
|                 | 12.2(33)SCB | This command was modified to change the addressing format for a SPA from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

**Usage Guidelines** Use the **show hw-module bay oir** command to obtain operational status information about a Wideband SPA. To display information for a specific SPA, specify *slot/subslot/bay* for the SPA. To display information for all SPAs in the router, use the **all** keyword.

The optional **internal** keyword displays detailed diagnostic information that is recommended only for use with Cisco technical support personnel.

[Table 208](#) describes the possible values for the Operational Status field in the output.

**Table 208**      **Operational Status Field Descriptions**

| Operational Status               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| admin down                       | SPA is administratively disabled by the <b>hw-module bay shutdown</b> global configuration command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| booting                          | SPA is initializing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| missing                          | SPA is not present in the SIP bay.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| ok                               | SPA is operational.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| out of service ( <i>reason</i> ) | <p>The SPA is out of service for one of the following reasons:</p> <p><b>Note</b>    The following reasons are not applicable to every SPA and can be platform-specific.</p> <ul style="list-style-type: none"> <li>Analyze failed—Failed to create a SPA data structure, most likely due to a memory allocation problem.</li> <li>Authentication failed—SPA has failed hardware validation.</li> <li>Data structure create error—Failed to create a SPA data structure, most likely due to a memory allocation problem.</li> <li>Event corrupt—A SPA online insertion and removal (OIR) event has been corrupted. This could be caused by a corrupted message between the SIP and the Route Processor (RP) or some other software or hardware problem.</li> <li>Event sequence error—A SPA OIR event was received out of sequence. This could be caused by a corrupted message between the SIP and the Route Processor (RP) or some other software or hardware problem.</li> <li>Fail code not set—Failure code could not be read from a SPA OIR event message. This could be caused by a corrupted message between the SIP and the RP or some other software or hardware problem.</li> <li>Failed too many times—SPA is disabled because it has failed more than the allowable limit on the platform.</li> <li>FPD upgrade failed—A field-programmable device (FPD), such as the Field-Programmable Gate Array (FPGA), failed to automatically upgrade.</li> <li>H/W signal deasserted—The SPA_OK or PWR_OK hardware signal indicating that the SPA is accessible is no longer asserted.</li> <li>Heartbeat failed—Occurs when intelligent SPAs encounter heartbeat failures.</li> <li>Incompatible FPD—An FPGA version mismatch with the Cisco IOS software has been detected for the SPA.</li> </ul> |

**Table 208**      **Operational Status Field Descriptions (continued)**

| Operational Status | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <ul style="list-style-type: none"> <li>• Init timeout—Time limit has been reached during initialization of a SPA.</li> <li>• Read SPA type failed—A read from the hardware for the SPA type failed.</li> <li>• Reload request—SPA reload is in progress from the <b>hw-module subslot reload</b> command.</li> <li>• SPA h/w error—The SPA software driver has detected a hardware error.</li> <li>• SPA ready timeout—A timeout occurred on the RP while waiting for the SPA to become operational.</li> <li>• SPA type mismatch—Occurs when you have pre-configured a SPA of one type, but have inserted a SPA of a different type.</li> <li>• SPA unrecognized—SPA is not supported by the Cisco IOS software release.</li> <li>• Start failed—Failed to start interfaces on SPA.</li> <li>• Unexpected inserted event—The SPA OIR software has received a SPA insertion event when the OIR software considered the SPA already present.</li> <li>• Wait h/w ok timeout—A timeout occurred while waiting for the SPA_OK and PWR_OK hardware signals to be asserted.</li> <li>• Wait start timeout—A timeout occurred on the SIP while waiting for permission from the RP to bring up the SPA.</li> </ul> |
| stopped            | SPA has been gracefully deactivated using the <b>hw-module subslot stop</b> privileged EXEC command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**Examples**

The following example shows the operational status of a Wideband SPA:

```
Router# show hw-module bay 1/0/0 oir
```

```
Module Model Operational Status

bay 1/0/0 SPA-24XDS-SFP ok
```

The following example shows the operational status of a Wideband SPA when the **internal** keyword is specified:

```
Router# show hw-module bay 1/0/0 oir internal
```

```
WARNING: This command is not intended for production use
and should only be used under the supervision of
Cisco Systems technical support personnel.
sm(spa_oir_tsm bay 1/0/0 TSM), running yes, state ready
Admin Status: admin enabled, Operational Status: ok(1)
Last reset Reason: audit failure
TSM Context:
 configured_spa_type 0x4AE
```

show hw-module bay oir

```
soft remove fail code 0x0(none)
last_fail_code 0x0(none)
fail_count 0
timed_fail_count 0, failed_spa_type 0x0
recovery_action 0
associated_fail_code 0x0(none)
sequence numbers: next from tsm 1, last to tsm 1
flags 0x0
Subslot:
spa type 0x4AE, active spa type 0x4AE
subslot flags 0x0, plugin flags 0x0
TSM Parameters:
wait_psm_ready_timeout 180000 ms, init_timeout 120000 ms
short_recovery_delay 5000 ms, long_recovery_delay 120000 ms
ok_up_time 600000 ms, bad_fail_count 10
fail_time_period 600000 ms, max_fail_count 5
supports pre-configuration
sm(spa_oir_audit bay 1/0/1), running yes, state sleep
SPA OIR state machine audit statistics
In-sync poll-count late-resp resp-fail restarts fail-count
bay 1/0/0 yes 2752 0 4 1 0
```

| Related Commands | Command            | Description                                                                        |
|------------------|--------------------|------------------------------------------------------------------------------------|
|                  | show hw-module bay | Displays information about the wideband channels or RF channels on a Wideband SPA. |



# show hw-module bay transceiver

To display information about the pluggable transceiver module, use the **show hw-module bay transceiver** command in privileged EXEC mode.

**show hw-module bay** *slot/subslot*/{*bay* | *port*} **transceiver** *transceiver-port-number* [**idprom** | **status**]

| Syntax Description             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                    | Slot where a SIP or cable line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR10012 router—The valid range for:               <ul style="list-style-type: none"> <li>– Cable line card is from 5 to 8</li> <li>– SIPs is 1 and 3</li> </ul> </li> </ul>            |
| <i>subslot</i>                 | Subslot where a SIP or cable line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR10012 router—The valid value for:               <ul style="list-style-type: none"> <li>– Cable line card is 0 or 1</li> <li>– SPAs in a SIP, prior to Cisco IOS Release 12.2(33)SCB is 0 or 1. For Cisco IOS Release 12.2(33)SCB and later releases, the value of subslot is not specified.</li> </ul> </li> </ul> |
| <i>bay</i>                     | Bay in a SIP where a SPA is located. The valid values are 0 (upper bay) and 1 (lower bay).                                                                                                                                                                                                                                                                                                                           |
| <i>port</i>                    | Port number. <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router and Cisco uBR7225VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid value for:               <ul style="list-style-type: none"> <li>– Slots 1 and 3 is 0</li> <li>– Slots 5 to 8 is from 0 to 4</li> </ul> </li> </ul>                                                                                   |
| <b>transceiver</b>             | Specifies the pluggable transceiver module installed in the <i>slot/subslot/bay</i> .                                                                                                                                                                                                                                                                                                                                |
| <i>transceiver-port-number</i> | Transceiver-port-number of the transceiver. The valid value is 0 or 1.                                                                                                                                                                                                                                                                                                                                               |
| <b>idprom</b>                  | Displays information for the transceiver identification programmable read only memory (idprom).                                                                                                                                                                                                                                                                                                                      |
| <b>status</b>                  | Displays information for the transceiver initialization status.                                                                                                                                                                                                                                                                                                                                                      |

**Command Default** None

**Command Modes** Privileged EXEC (#)

## show hw-module bay transceiver

### Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCA | This command was introduced. |

### Examples

The following example is a sample output of the **show hw-module bay transceiver** command for wideband channel 0 on the Wideband SPA located in slot 1, subslot 0, bay 0:

```
Router# show hw-module bay 1/0/0 transceiver 0 idprom
```

```
IDPROM for transceiver SPA_TYPE_ETHER_1x10GE_V2:
 Description = XFP optics (type 6)
 Transceiver Type: = DWDM XFP 1530.33 (138)
 Product Identifier (PID) = DWDM-XFP-30.33
 Vendor Revision = 04
 Serial Number (SN) = FLJ1212G578
 Vendor Name = CISCO
 Vendor OUI (IEEE company ID) = 00.00.0E (14)
 CLEI code = IP9IAAZCAA
 Cisco part number = 10-2370-01
 Device State = Enabled.
 Date code (yy/mm/dd) = 08/03/25
 Connector type = LC.
 Encoding = 64B/66B
 SONET Scrambled
 NRZ
 Minimum bit rate = 9900 Mbits/s
 Maximum bit rate = 11100 Mbits/s
```

### Related Commands

| Command                       | Description                                                                        |
|-------------------------------|------------------------------------------------------------------------------------|
| <b>show hw-module bay</b>     | Displays information about the wideband channels or RF channels on a Wideband SPA. |
| <b>show hw-module bay oir</b> | Displays the operational status of a Wideband SPA.                                 |

# show interface bundle

To display information about a specific virtual cable bundle, use the **show interface bundle** command in privileged EXEC mode.

```
show interface bundle number [accounting | controller | counters {protocol {status}}] | crb |
description | fair-queue | intercept | irb | mac-accounting | monitor interval | mpls-exp |
precedence | random-detect | stats | summary]
```

| Syntax Description             |  |                                                                                                                               |
|--------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------|
| <i>number</i>                  |  | Specific virtual bundle. The valid values range from 1 to 255.                                                                |
| <b>accounting</b>              |  | Displays accounting information for the specified virtual interface bundle.                                                   |
| <b>controller</b>              |  | Displays information about interface status, configuration, and controller status for the specified virtual interface bundle. |
| <b>protocol</b>                |  | Displays information about interface protocol counters for the specified virtual interface bundle.                            |
| <b>status</b>                  |  | Displays information about the current status of enabled protocols.                                                           |
| <b>crb</b>                     |  | Displays the interface routing and bridging information.                                                                      |
| <b>description</b>             |  | Displays the specified virtual interface bundle description.                                                                  |
| <b>fair-queue</b>              |  | Displays the interface bundle Weighted Fair Queueing (WFQ) information.                                                       |
| <b>intercept</b>               |  | Displays the intercept streams information on the specified virtual interface bundle.                                         |
| <b>irb</b>                     |  | Displays the interface bundle routing and bridging information.                                                               |
| <b>mac-accounting</b>          |  | Displays the interface bundle MAC accounting information.                                                                     |
| <b>monitor</b> <i>interval</i> |  | Monitors the specified interface bundle continuously at the specified interval.                                               |
| <b>mpls-exp</b>                |  | Displays the MPLS experimental accounting information on the specified interface bundle.                                      |
| <b>precedence</b>              |  | Displays the interface precedence accounting information.                                                                     |
| <b>random-detect</b>           |  | Displays the interface Weighted Random Early Detection (WRED) information.                                                    |
| <b>stats</b>                   |  | Displays interface packets and octets, in and out, by the switching path.                                                     |
| <b>summary</b>                 |  | Displays the summary of activity on the specified interface bundle.                                                           |

**Command Default** No default behavior or values for this command.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCA | This command was introduced. |

## show interface bundle

| Release     | Modification                                                                                                                                              |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCB | Support for the <b>multicast-sessions</b> keyword was removed. Running the command with the <b>multicast-sessions</b> keyword does not display an output. |
| 12.2(33)SCE | The <b>multicast-sessions</b> keyword was removed.                                                                                                        |

### Usage Guidelines

Starting with Cisco IOS Release 12.2(33)SCB, the **multicast-sessions** keyword does not display any output, although it is available as part of the **show interface bundle** command.

### Examples

The following is an example of the **show interface bundle** command for bundle 1:

```
Router# show interface bundle 1
```

```
Load for five secs: 2%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *06:03:45.483 EDT Wed Oct 12 2011

Bundle1 is up, line protocol is up
 Hardware is Cable Virtual-bundle interface, address is 0013.5f03.a4e3 (bia 000
0.0000.0000)
 Internet address is 5.65.0.1/16
 MTU 1500 bytes, BW 26000 Kbit, DLY 1000 usec,
 reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation MCNS, loopback not set
 Keepalive set (10 sec)
 ARP type: ARPA, ARP Timeout 04:00:00
 Last input 00:00:25, output never, output hang never
 Last clearing of "show interface" counters never
 Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
 Interface Bundle1 queueing strategy: fifo
 5 minute input rate 0 bits/sec, 0 packets/sec
 5 minute output rate 0 bits/sec, 0 packets/sec
 1676 packets input, 283993 bytes, 0 no buffer
 Received 601 broadcasts (0 IP multicasts)
 0 runts, 0 giants, 0 throttles
 51 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 4163 packets output, 379783 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 output buffer failures, 0 output buffers swapped out
```

The following is an example of the **show interface bundle accounting** command for bundle 1:

```
Router# show interface bundle 1 accounting
```

```
Load for five secs: 1%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *06:04:41.271 EDT Wed Oct 12 2011

Bundle1
 Protocol Pkts In Chars In Pkts Out Chars Out
 Other 1678 0 0 0
 IP 1406 270933 4209 384390
 ARP 294 17640 0 0
```

The following is an example of the **show interface bundle controller** command for bundle 1:

```
Router# show interface bundle 1 controller
```

```
Load for five secs: 1%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *06:04:58.539 EDT Wed Oct 12 2011
```

```

Bundle1 is up, line protocol is up
 Hardware is Cable Virtual-bundle interface, address is 0013.5f03.a4e3 (bia 000
0.0000.0000)
 Internet address is 5.65.0.1/16
 MTU 1500 bytes, BW 26000 Kbit, DLY 1000 usec,
 reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation MCNS, loopback not set
 Keepalive set (10 sec)
 ARP type: ARPA, ARP Timeout 04:00:00
 Last input 00:00:17, output never, output hang never
 Last clearing of "show interface" counters never
 Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
 Interface Bundle1 queueing strategy: fifo
 5 minute input rate 0 bits/sec, 0 packets/sec
 5 minute output rate 1000 bits/sec, 1 packets/sec
 1707 packets input, 289077 bytes, 0 no buffer
 Received 613 broadcasts (0 IP multicasts)
 0 runs, 0 giants, 0 throttles
 51 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 4224 packets output, 386306 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 output buffer failures, 0 output buffers swapped out

```

The following is an example of the **show interface bundle counter protocol** command for bundle 1:

```

Router# show interface bundle 1 counters protocol status

Load for five secs: 0%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *06:05:30.695 EDT Wed Oct 12 2011

Protocols allocated:
 Bundle1: Other, IP, ARP

```

The following is an example of the **show interface bundle crb** command for bundle 1:

```

Router# show interface bundle 1 crb

Load for five secs: 2%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *06:05:57.267 EDT Wed Oct 12 2011
Bundle1

Routed protocols on Bundle1:
 ip

```

The following is an example of the **show interface bundle description** command for bundle 1:

```

Router# show interface bundle 1 description

Load for five secs: 0%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *06:06:22.243 EDT Wed Oct 12 2011

Interface Status Protocol Description
Bul up up

```

The following is an example of the **show interface bundle intercept** command for bundle 1:

```

Router# show interface bundle 1 intercept

Load for five secs: 2%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *06:06:56.763 EDT Wed Oct 12 2011
No interception active

```

## show interface bundle

The following is an example of the **show interface bundle multicast-sessions** command for bundle 1:



### Note

The **multicast-sessions** keyword is not available for Cisco IOS Release 12.2(33)SCE and later releases.

```
Router# show interface bundle 1 multicast-sessions
```

Multicast Sessions on Bundle1

| Group      | Interface | GC | SAID | SFID | GQC | GEn | RefCount | GC-Interface | State  |
|------------|-----------|----|------|------|-----|-----|----------|--------------|--------|
| 224.1.1.45 | Bundle1.1 | 1  | 8193 | ---  | 1   | 5   | 1        | Bundle1      | ACTIVE |
| 224.1.1.46 | Bundle1.1 | 1  | 8193 | ---  | 1   | 5   | 1        | Bundle1      | ACTIVE |
| 224.1.1.47 | Bundle1.1 | 1  | 8193 | ---  | 1   | 5   | 1        | Bundle1      | ACTIVE |

Aggregate Multicast Sessions on Bundle1

Aggregate Sessions for SAID 8193 GQC 1 CurrSess 3

| Group      | Interface | GC | SAID | SFID | AggGQC | GEn | RefCount | GC-Interface |
|------------|-----------|----|------|------|--------|-----|----------|--------------|
| 224.1.1.45 | Bundle1.1 | 1  | 8193 | ---  | 1      | 5   | 1        | Bundle1      |
| 224.1.1.46 | Bundle1.1 | 1  | 8193 | ---  | 1      | 5   | 1        | Bundle1      |
| 224.1.1.47 | Bundle1.1 | 1  | 8193 | ---  | 1      | 5   | 1        | Bundle1      |

The following is an example of the **show interface bundle stats** command for bundle 1:

```
Router# show interface bundle 1 stats
```

Load for five secs: 0%/0%; one minute: 1%; five minutes: 1%  
Time source is hardware calendar, \*06:10:18.775 EDT Wed Oct 12 2011

Bundle1

| Switching path | Pkts In | Chars In | Pkts Out | Chars Out |
|----------------|---------|----------|----------|-----------|
| Processor      | 661     | 179549   | 0        | 0         |
| Route cache    | 1175    | 130728   | 4512     | 414497    |
| Total          | 1836    | 310277   | 4512     | 414497    |

The following is an example of the **show interface bundle summary** command for bundle 1:

```
Router# show interface bundle 1 summary
```

Load for five secs: 1%/0%; one minute: 1%; five minutes: 1%  
Time source is hardware calendar, \*06:10:28.167 EDT Wed Oct 12 2011

```
*: interface is up
IHQ: pkts in input hold queue IQD: pkts dropped from input queue
OHQ: pkts in output hold queue OQD: pkts dropped from output queue
RXBS: rx rate (bits/sec) RXPS: rx rate (pkts/sec)
TXBS: tx rate (bits/sec) TXPS: tx rate (pkts/sec)
TRTL: throttle count
```

| Interface | IHQ | IQD | OHQ | OQD | RXBS | RXPS | TXBS | TXPS | TRTL |
|-----------|-----|-----|-----|-----|------|------|------|------|------|
| *Bundle1  | 0   | 0   | 0   | 0   | 0    | 0    | 0    | 0    | 0    |

Router#

## Related Commands

| Command                           | Description                                                                                                                                 |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>show interface cable</b>       | Displays configuration and status information for the cable interface.                                                                      |
| <b>show interface cable modem</b> | Displays information about cable modems and associated customer premises equipment (CPE) devices connected to a particular cable interface. |

# show interface cable

To display the current configuration and status of a cable interface, use the **show interface cable** command in privileged EXEC mode.

```
show interface cable { slot/port \ slot/subslot/port } [options]
```

Cisco IOS Release 12.2(33)SCE and later

```
show interface cable { slot/cable-interface-index \ slot/subslot/cable-interface-index } [options]
```

| Syntax Description    |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| slot                  | Slot where the line card resides. <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li><li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li><li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li></ul>                                                                                                                                                                     |
| subslot               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| port                  | Downstream port number. <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li><li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li></ul>                                                                                                                                                                                  |
| cable-interface-index | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards.<br><br>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.<br><br>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14. |

---

*options*

Cable-specific options are documented in their own command reference pages:

- **show interface cable downstream**
- **show interface cable intercept**
- **show interface cable mac-scheduler**
- **show interface cable monitor**
- **show interface cable qos paramset**
- **show interface cable service-flow**
- **show interface cable sid**
- **show interface cable signal-quality**
- **show interface cable upstream**

A number of non-cable-specific options are also supported (but not all are meaningful for cable interfaces):

**accounting**—Displays the number of packets of each protocol type that was sent through the interface.

**crb**—Displays routing and bridging information.

**description**—Displays the description entered for the interface.

**fair-queue**—Displays distributed weighted fair queuing (DWFQ) statistics.

**irb**—Displays integrated routing bridge information.

**mac-accounting**—Displays Ethernet MAC accounting information.

**random-detect**—Displays weighted random early detection (WRED) information.

**rate-limit**—Displays rate-limit information.

**shape**—Displays Traffic Shape information.

**stats**—Displays numbers of packets that were switched.

---

**Note**

For information on the non-cable specific options, see the Cisco IOS Release 12.2 documentation on [Cisco.com](http://Cisco.com) and the Customer Documentation CD-ROM.

---

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**Command Modes**

Privileged EXEC (#)

---

**Command History**

| Release     | Modification                                                                                                                                                                                                    |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 XA     | This command was introduced.                                                                                                                                                                                    |
| 12.0(3)T    | This command was ported to the mainline release.                                                                                                                                                                |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

---



**Examples**

The following is sample output for the **show interface cable** command:

```
CMTS01# show interface cable 6/0/0

Cable6/0 is up, line protocol is up
 Hardware is BCM3210 ASIC, address is 000a.13e8.1ca8 (bia 000a.13e8.1a60)
 Internet address is 1.1.1.3/24
 MTU 1500 bytes, BW 27000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
 Encapsulation, loopback not set, keepalive not set
 ARP type: ARPA, ARP Timeout 04:00:00
 Last input 4d07h, output 00:00:00, output hang never
 Last clearing of "show interface" counters never
 Queueing strategy: fifo
 Output queue 0/40, 0 drops; input queue 0/75, 0 drops
 5 minute input rate 1834000 bits/sec, 2385 packets/sec
 5 minute output rate 1982000 bits/sec, 2431 packets/sec
 24461542 packets input, 2348214388 bytes, 0 no buffer
 Received 1979 broadcasts, 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 24854257 packets output, 2536222931 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 output buffer failures, 0 output buffers swapped out
```

Table 0-209 describes the fields shown in the **show interface cable** display.

**Table 0-209**      *show interface cable Field Descriptions*

| Field                                                           | Description                                                                                                                                                |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable slot/cable-interface-index is up/...administratively down | Indicates whether the interface hardware is currently active or taken down by the administrator.                                                           |
| line protocol is up/...administratively down                    | Indicates whether the software processes that handle the line protocol believe the interface is usable or if it has been taken down by the administrator.  |
| hardware                                                        | Hardware type and address.                                                                                                                                 |
| Internet address                                                | Internet address followed by subnet mask.                                                                                                                  |
| MTU                                                             | Maximum transmission unit (MTU) of the interface.                                                                                                          |
| BW                                                              | Bandwidth of the interface in kilobits per second.                                                                                                         |
| DLY                                                             | Delay of the interface in microseconds.                                                                                                                    |
| rely                                                            | Reliability of the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is 100 percent reliability.) |
| load                                                            | Load on the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is complete saturation.)            |
| Encapsulation                                                   | Encapsulation method assigned to this interface.                                                                                                           |
| ARP type                                                        | Type of Address Resolution Protocol (ARP) and timeout value assigned.                                                                                      |
| Last input                                                      | Number of hours, minutes, and seconds since the last packet was successfully received by an interface.                                                     |
| output                                                          | Number of hours, minutes, and seconds since the last packet was successfully sent by an interface.                                                         |

**Table 0-209**     *show interface cable Field Descriptions (continued)*

| Field                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Last clearing of “show interface” counters        | Time at which the counters that measure cumulative statistics (such as number of bytes sent and received) were last reset to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Queueing strategy                                 | Displays the type of queueing configured for this interface. In the following example output, the type of queueing configured is first-in first-out (FIFO).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Output queue                                      | Number of packets in the output queue. The format of this number is A/B, where A indicates the number of packets in the queue, and B indicates the maximum number of packets allowed in the queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| drops                                             | Indicates the number of packets dropped because of a full queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| input queue/drops                                 | Number of packets in the input queue. The format of this number is A/B, where A indicates the number of packets in the queue, and B indicates the maximum number of packets allowed in the queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| drops                                             | Indicates the number of packets dropped because of a full queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Five minute input rate<br>Five minute output rate | Average number of bits and packets sent per second in the last five minutes. The five-minute interval is the default time period for statistics collection and can be changed for each individual cable interface using the <b>load-interval</b> command in interface configuration mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Note</b>                                       | These statistics are calculated using a decayed averaging method, where only the average is stored over the interval period, not the individual samples. Every time a sample average is taken, a percentage of the sample and a percentage of the average are added together to create the new average. If traffic stops for a time period, these statistics do not immediately go to zero but drop with a decay rate of about 70 percent per time period.<br><br>For example, if the interface is passing 1,000 packets per second (pps) before traffic stops, the <b>show interface cable</b> command shows the rate being 300 pps at the end of the first time interval. The rate then drops to 90 pps at the end of the second time interval, and so forth. |
| packets input                                     | Total number of error-free packets received by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| bytes input                                       | Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Note</b>                                       | When using bundled cable interfaces on Cisco uBR7200 series routers, the input packet counters for the master interface also include the packet counts for slave interfaces, except when using a Broadband Processing Engine (BPE) cable interface (such as the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X). On BPE cards and on the Cisco uBR10012 router, the input counters for master and slave cable interfaces are not combined.                                                                                                                                                                                                                                                                                                                             |
| no buffer                                         | Number of received packets discarded because there was no buffer space in the main system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Received broadcast                                | Total number of broadcast or multicast packets received by the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| runts                                             | Number of packets that are discarded because they are smaller than the medium’s minimum packet size.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 0-209**     *show interface cable Field Descriptions (continued)*

| Field                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| giants                    | <p>Number of packets that are discarded because they are bigger than the standard Ethernet Maximum Transmission Unit (MTU) size. For Ethernet packets, RFC 1757 defines giants as “the total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.”</p> <p><b>Note</b>    In addition, to account for the different Ethernet and other packet encapsulations on the network, packets are considered giants when they exceed the configured MTU size plus 114 bytes.</p> |
| input errors              | Total number of errors received on the interface. This count includes runts and giants, which are shown above, as well as other errors, such as no buffers, and CRC, frame, overrun, and ignored counts. This count can also include DOCSIS protocol errors such as an invalid SID in the DOCSIS frame, a bad extended header length, corrupted concatenated packets, and invalid bandwidth requests.                                                                                                                                                             |
| CRC                       | Indicates the number of times the cyclic redundancy checksum (CRC) generated by the originating LAN station or far-end device does not match the checksum calculated from the data received.                                                                                                                                                                                                                                                                                                                                                                      |
| frame                     | Number of packets received incorrectly having a CRC error and a non-integer number of octets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| overrun                   | Number of times the receiver hardware was unable to forward received data to a hardware buffer because the input rate exceeded the receiver’s ability to handle the data.                                                                                                                                                                                                                                                                                                                                                                                         |
| ignored                   | Number of received packets ignored by the interface because the interface hardware ran low on internal buffers.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| packets output            | Total number of messages sent by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| bytes                     | Total number of bytes, including data and MAC encapsulation, sent by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| underruns                 | Number of times the sender has been running faster than the receiving device can handle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| output errors             | Sum of all errors that prevented the final transmission of packets out of the interface being examined.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| collisions                | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| interface resets          | Number of times an interface has been completely reset.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| output buffer failures    | Number of times the output buffer has failed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| output buffer swapped out | Number of times the output buffer has been swapped out.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**show interface cable**

| Related Commands | Command                                    | Description                                                                 |
|------------------|--------------------------------------------|-----------------------------------------------------------------------------|
|                  | <b>show interface cable downstream</b>     | Displays information about the downstream on the cable interface.           |
|                  | <b>show interface cable sid</b>            | Displays information by service identifier (SID) of each CM on the network. |
|                  | <b>show interface cable signal-quality</b> | Displays information about the cable signal quality.                        |
|                  | <b>show interface cable upstream</b>       | Displays information about one or all upstreams on the cable interface.     |

# show interface cable admission-control reservation

To display service flows, categorizations, and bandwidth consumption on the Cisco CMTS, for the specified interface, and the specified service flow direction, use the **show interface cable admission-control reservation** command in privileged EXEC mode.

```
show interface cable { slot/port | slot/subslot/port } admission-control reservation { downstream
| upstream } port-no
```

## Cisco IOS Release 12.2(33)SCE and later

```
show interface cable { slot/cable-interface-index | slot/subslot/cable-interface-index }
admission-control reservation { downstream | upstream } port-no
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                       |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                   |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |
| <b>downstream</b>            | Displays downstream service flow information for the designated cable interface.                                                                                                                                                                                                                                                                                                                                                             |
| <b>upstream</b>              | Displays upstream service flow information for the designated cable interface. The port number may be specified here for more limited display.                                                                                                                                                                                                                                                                                               |
| <i>port-no</i>               | Optional value allows you to specify the upstream port number for more limited information.                                                                                                                                                                                                                                                                                                                                                  |

## Defaults

No default behavior or values for this command. However, Cisco IOS Release 12.3(21)BC supports default operation and non-default configuration for feature on the Cisco CMTS.

## Command Modes

Privileged EXEC

## show interface cable admission-control reservation

### Command History

| Release     | Modification                                                                                                                                                                                                    |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router.                                                                                                                      |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

### Usage Guidelines

For additional information about using this command, refer to the following documents on Cisco.com:

- *Admission Control for the Cisco CMTS*
- *Service Flow Admission Control for the Cisco CMTS*

### Examples

The following example illustrates sample output and status of the Service Flow Admission Control feature, and the **show interface cable admission-control reservation { downstream | upstream } port-no** command.

```
Router# show interface cable 5/1/1 admission-control reservation downstream.
SfId Mac Address Bucket Bucket Name State Current Reserv
4 0000.cad6.f052 8 act 0
88 0000.cad6.f052 8 act 2000
6 0000.cad6.eece 8 act 0
21 0000.cad6.eece 8 act 2000
8 0000.cad6.eebe 8 act 0
24 0000.cad6.eebe 8 act 2000
10 0000.cadb.30a6 8 act 0
27 0000.cadb.30a6 8 act 2000
```

The following example illustrates further information for the Service Flow Admission Control feature with abbreviated command syntax. This example displays threshold levels and current reservation per bucket, and the oversubscribed bandwidth per bucket. Cisco IOS indicates implicitly calculated threshold with asterisk.

```
Router# sh cable admission-control interface ca 5/1/1 upstream 0
Interface Cable5/1/1
Upstream Bit Rate (bits per second) = 4096000
Resource - Upstream Bandwidth

Bucket Names Minor # of Major # of Excls # of Non-Ex Curr. Curr. Conf # of
No Level Times Level Times Level Times Level Resv Ovrspb Level Rejec
1 5 1312 7 1262 45 0 0 31 0 I 36
2 0 0 0 0 0 0 6* 0 0 I 0
3 0 0 0 0 0 0 6* 0 0 I 0
4 0 0 0 0 0 0 6* 0 0 I 0
5 0 0 0 0 0 0 6* 0 0 I 0
6 0 0 0 0 0 0 6* 0 0 I 0
7 0 0 0 0 0 0 6* 0 0 I 0
8 5 31 7 29 49 11 5 79 25 I 0
```

| Related Commands | Command                                                   | Description                                                                                                                                                                                                    |
|------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable admission-control ds-bandwidth</b>               | Sets minor, major and exclusive thresholds for downstream voice or data bandwidth for each or all interfaces on the Cisco CMTS                                                                                 |
|                  | <b>cable admission-control preempt priority-voice</b>     | Changes the default PacketCable Emergency 911 call preemption functions on the Cisco CMTS, supporting throughput and bandwidth requirements for Emergency 911 calls above all other buckets on the Cisco CMTS. |
|                  | <b>cable admission-control us-bandwidth</b>               | Configures global or interface-level upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS.                                                                                 |
|                  | <b>cable application-type include</b>                     | Associates an application type with a specific and prioritized bucket on the Cisco CMTS.                                                                                                                       |
|                  | <b>cable application-type name</b>                        | Assigns an alpha-numeric name for the specified bucket.                                                                                                                                                        |
|                  | <b>debug cable admission-control flow-categorization</b>  | Displays service flow categorization results, enabled when a service flow is classified.                                                                                                                       |
|                  | <b>show application-buckets</b>                           | Displays rules for any or all buckets supporting Service Flow Admission Control on the Cisco CMTS.                                                                                                             |
|                  | <b>show interface cable admission-control reservation</b> | Displays service flows, categorizations, and bandwidth consumption on the Cisco CMTS, for the specified interface, and the specified service flow direction.                                                   |

# show interface cable cable-monitor

To display cable monitor flow information, use the **show interface cable cable-monitor** command in privileged EXEC mode.

```
show interface cable { slot/port | slot/subslot/port } cable-monitor
```

Cisco IOS Release 12.2(33)SCE and later

```
show interface cable { slot/cable-interface-index | slot/subslot/cable-interface-index }
cable-monitor [cam | verbose]
```

| Syntax Description |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                       |
|                    | <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
|                    | <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                   |
|                    | <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |
|                    | <b>cam</b>                   | (Optional) Displays detailed content addressable memory (CAM) information.                                                                                                                                                                                                                                                                                                                                                                   |
|                    | <b>verbose</b>               | (Optional) Displays detailed monitor flow information.                                                                                                                                                                                                                                                                                                                                                                                       |

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                                                                                                                                                                                                    |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCA | This command is introduced.                                                                                                                                                                                     |
|                 | 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |



**Examples**

The following is a sample output from the **show interface cable cable-monitor** command:

```
Router# show interface cable 5/0 cable-monitor
```

| US/ DS | Time Stmp | Outbound Interface | Flow Type | Flow Type Identifier | Flow Extn. | Packet Type | MAC Extn. | MAC Type | Encap Type |
|--------|-----------|--------------------|-----------|----------------------|------------|-------------|-----------|----------|------------|
| us     | no        | Et1/2              | us-port   | 0                    | yes        | data        | no        | -        | docsis     |
| all    | no        | Et1/2              | acc-list  | 103                  | yes        | data        | no        | -        | docsis     |
| all    | yes       | Et1/2              | mac-addr  | 0050.0000.0000       | yes        | mac         | no        | -        | -          |

The following is a sample output from the **show interface cable cable-monitor cam** command:

```
Router# show interface cable6/0/0 cable-monitor cam
```

```
Sniffer Wideband interface = Wi6/0/0:0
```

```
Sniff points 0x9
```

```
DS Unconditional sniffing for 0 flows. FlowIndex: Total: 0. Hits 0
```

```
DS HighPrio Unconditional sniffing for 0 flows. FlowIndex: Total: 0. Hits 0
```

```
US Packet Unconditional sniffing
```

```
US 0, 1 FlowIndex: 2 Total: 1. Hits 1035
```

```
US 1, 0 FlowIndex: Total: 0. Hits 0
```

```
US 2, 0 FlowIndex: Total: 0. Hits 0
```

```
US 3, 0 FlowIndex: Total: 0. Hits 0
```

```
US Frag Unconditional sniffing
```

```
US 0, 0 FlowIndex: Total: 0. Hits 0
```

```
US 1, 0 FlowIndex: Total: 0. Hits 0
```

```
US 2, 0 FlowIndex: Total: 0. Hits 0
```

```
US 3, 0 FlowIndex: Total: 0. Hits 0
```

```
MAC Address CAM :
```

```
Entry 0, MAC 7cb2.1b0f.ea7a Refcount 1 FlowIndex: 1 Total: 1 Hits 401
```

```
Entry 1, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 2, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 3, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 4, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 5, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 6, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 7, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 8, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 9, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 10, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 11, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 12, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 13, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 14, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 15, MAC 0000.0000.0000 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Sid CAM :
```

```
Entry 0, Sid 1, US 1 Refcount 1 FlowIndex: 1 Total: 1 Hits 825
```

```
Entry 1, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 2, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 3, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 4, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 5, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 6, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 7, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 8, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 9, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 10, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 11, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

```
Entry 12, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
```

**show interface cable cable-monitor**

```

Entry 13, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
Entry 14, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0
Entry 15, Sid 0, US 0 Refcount 0 FlowIndex: Total: 0 Hits 0

```

The following is a sample output from the **show interface cable cable-monitor verbose** command:

```
Router# show interface cable6/0/0 cable-monitor verbose
```

```

Sniffer Wideband interface = Wi6/0/0:0
Index 0, Direction all
 DS CAM Index 0 (MAC 7cb2.1b0f.ea74), Hits 10
 No US CAM Entry
 No US CAM Entry
 No US CAM Entry
 No US CAM Entry
 10 packets evaluated, 10 output, 0 No buffer
 0 NotData, 0 NotMac, 0 Extn not matched, 0 US MacAddress mismatch
 0 NotMap, 0 No sid in MAP, 0 not REQ, 0 not Grant
 0 Not DSA, 0 not DSC, 0 Not DSD
 0 Sid mismatch in DS Pkts, 0 ACL match failed
 In VCCI 0x5B, Out VCCI 0xFFFF

Index 1, Direction us
 No DS CAM Entry
 No US CAM Entry
 No US CAM Entry
 No US CAM Entry
 582 packets evaluated, 582 output, 0 No buffer
 0 NotData, 0 NotMac, 0 Extn not matched, 0 US MacAddress mismatch
 0 NotMap, 0 No sid in MAP, 0 not REQ, 0 not Grant
 0 Not DSA, 0 not DSC, 0 Not DSD
 0 Sid mismatch in DS Pkts, 0 ACL match failed
 In VCCI 0x5B, Out VCCI 0x56

```

**Table 0-210**     *show interface cable monitor Field Descriptions*

| Field                | Description                                                                                                                                             |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| DS                   | Downstream. Indicates that only downstream flows are monitored.                                                                                         |
| UP                   | Upstream. Indicates that only upstream flows are monitored.                                                                                             |
| ALL                  | Indicates that all flows are monitored.                                                                                                                 |
| Time Stmp            | “Yes” indicates that forwarded packets have been time-stamped, with appended 4 bytes. “No” indicates that forwarded packets have not been time-stamped. |
| Outbound Interface   | Identifies the interfaces where the packets have been forwarded to (Ethernet or Fast Ethernet).                                                         |
| Flow Type            | Identifies the selected flow type, MAC-address, access-list number, or upstream port number.                                                            |
| Flow Type Identifier | MAC address, access-list number, or service ID.                                                                                                         |
| Flow Extn.           | “Yes” indicates that extended filters are configured, and “no” indicates that no extended filters have been configured.                                 |
| MAC Type             | Not applicable.                                                                                                                                         |
| Encap                | DOCSIS encapsulation.                                                                                                                                   |
| Type                 | Forwarded packets with Ethernet encapsulation.                                                                                                          |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command              | Description                                                                                    |
|----------------------|------------------------------------------------------------------------------------------------|
| <b>cable monitor</b> | Enables the forwarding of selected packets on the cable interface to an external LAN analyzer. |

# show interface cable downstream

To display information about the downstreams on a cable interface, use the **show interface cable downstream** command in privileged EXEC mode.

```
show interface cable {slot/port | slot/subslot/port} downstream
```

Cisco IOS Release 12.2(33)SCE and later

```
show interface cable {slot/cable-interface-index | slot/subslot/cable-interface-index} downstream
```

Syntax Description

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| slot                  | Slot where the line card resides. <ul style="list-style-type: none"><li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li><li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li><li>Cisco uBR10012 router—The valid range is from 5 to 8.</li></ul>                                                                                                                                                                           |
| subslot               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| port                  | Downstream port number. <ul style="list-style-type: none"><li>Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li><li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li></ul>                                                                                                                                                                                      |
| cable-interface-index | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards.<br><br>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.<br><br>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14. |

Defaults

No default behavior or values

Command Modes

Privileged EXEC

Command History

| Release   | Modification                                                                                     |
|-----------|--------------------------------------------------------------------------------------------------|
| 11.3 XA   | This command was introduced.                                                                     |
| 12.0(3)T  | Command ported to the mainline release.                                                          |
| 12.1(4)CX | Output was expanded for <b>show interface cable downstream</b> command for DOCSIS 1.1 operation. |

| Release     | Modification                                                                                                                                                                                                    |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(4)BC1  | Support was added to the Release 12.2 BC train.                                                                                                                                                                 |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

## Examples

The following example is sample output from the **show interface cable downstream** command for Cisco IOS releases that support only DOCSIS 1.0 or 1.0+ operation:

```
CMTS01# show interface cable 6/0 downstream
```

```
Cable6/0: Downstream is up
 111947771 packets output, 1579682655 bytes, 0 discarded
 0 output errors
```

The following is sample output from the **show interface cable downstream** command for Cisco IOS releases that support only DOCSIS 1.1 operation:

```
Router# show interface cable 4/0 downstream
```

```
Cable4/0:Downstream is up
 54335436 packets output, 2854290447 bytes, 0 discarded
 0 output errors
 1 total active devices, 1 active modems
 Total downstream bandwidth: 27000000 bps
 Total downstream reserved bandwidth: 1000000 bps
 Worst case latency for low latency queue: 0 usecs
 Current Upper limit for worst case latency: 0 usecs
```

```
Router#
```

[Table 0-211](#) describes the fields shown in the **show interface cable downstream** display.

**Table 0-211** *show interface cable downstream Field Descriptions*

| Field                                     | Description                                                                                                                                                                                                               |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable                                     | Indicates the location of the downstream interface.                                                                                                                                                                       |
| Downstream is up/...administratively down | Indicates the administrative state of the interface.                                                                                                                                                                      |
| packets output                            | Total number of data packets that have been transmitted on this downstream cable interface.                                                                                                                               |
| bytes                                     | The number of bytes for data packets that have been transmitted on this downstream cable interface.                                                                                                                       |
| discarded                                 | Total number of packets that were not transmitted on the downstream, because of an error, such as a buffer overrun, the Cisco CMTS running out of memory, or the frame being larger than the cable interface's MTU value. |
| output errors                             | Total number of packets that could not be transmitted on this downstream cable interface because of all errors.                                                                                                           |
| total active devices                      | Total number of active cable modems and customer premises equipment (CPE) devices that are connected to this downstream cable interface.                                                                                  |

**Table 0-211**      *show interface cable downstream Field Descriptions (continued)*

| Field                                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| active modems                              | Total number of active cable modems that are connected to this downstream cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Total downstream bandwidth                 | Total bandwidth associated with this downstream cable interface, in bits per second.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Total downstream reserved bandwidth        | Total bandwidth on this downstream cable interface that has been reserved by specifying a value for the Min Reserved Traffic Rate field for the downstream service flow in the cable modems' DOCSIS configuration files.                                                                                                                                                                                                                                                                                            |
| Worst case latency for low latency queue   | Worst case latency value, in microseconds, that is allowed on this downstream cable interface, as determined by the Max DS Latency field for the downstream service flow in the cable modems' DOCSIS configuration files.                                                                                                                                                                                                                                                                                           |
| Current Upper limit for worst case latency | <p>Lowest worst case latency value, in microseconds, that is allowed on this downstream cable interface. The Cisco CMTS uses the lowest specified Max DS Latency value that has been specified for a downstream service flow in any of the DOCSIS configuration files being used by cable modems on this downstream.</p> <p>If a cable modem tries to register a downstream service flow that uses a worst case latency that is greater than this value, the Cisco CMTS will refuse to admit that service flow.</p> |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                                    | Description                                                                 |
|--------------------------------------------|-----------------------------------------------------------------------------|
| <b>show interface cable</b>                | Displays configuration and status information for the cable interface.      |
| <b>show interface cable sid</b>            | Displays information by service identifier (SID) of each CM on the network. |
| <b>show interface cable signal-quality</b> | Displays information about the cable signal quality.                        |
| <b>show interface cable upstream</b>       | Displays information about one or all upstreams on the cable interface.     |

# show interface cable dsg downstream

To display interface configuration and status information for Advanced-mode DOCSIS Set-top Gateway (A-DSG) downstreams on a Cisco CMTS router, use the **show interface cable dsg downstream** command in privileged EXEC mode.

```
show interface cable {slot/port | slot/subslot/port} dsg downstream [dcd | rule rule-id [cfr | clients | verbose] | tunnel tunnel-id]
```

**Cisco IOS Release 12.2(33)SCE and later**

```
show interface cable {slot/cable-interface-index | slot/subslot/cable-interface-index} dsg downstream [dcd | rule rule-id [cfr | clients | verbose] | tunnel tunnel-id]
```

| Syntax                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b>                   | Specifies details of a cable interface line card: <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides.</li> <li><i>subslot</i>—(Cisco uBR10012 only) Secondary slot number of the line card.</li> <li><i>port</i>—Downstream port number of the line card.</li> <li><i>cable-interface-index</i>—Downstream port or MAC domain index of the line card.</li> </ul> <p><a href="#">Table 212</a> in the Usage Guidelines section lists valid values for these arguments.</p> |
| <b>dcd</b>                     | (Optional) Displays downstream channel descriptor (DCD) messages for the A-DSG interface.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>rule</b> <i>rule-id</i>     | (Optional) Displays interface-level information for A-DSG rules on the Cisco CMTS router, such as rule state, tunnels, classifiers, client information, upstream channel identifier, and the number of vendors associated to a rule on a given downstream.                                                                                                                                                                                                                                                 |
| <b>cfr</b>                     | (Optional) Displays the list of classifiers associated to the A-DSG rule, such as classifiers associated with the rule-id under the interface.                                                                                                                                                                                                                                                                                                                                                             |
| <b>clients</b>                 | (Optional) Displays clients associated with the rule-id under the interface.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>verbose</b>                 | (Optional) Displays A-DSG downstream rule detail information.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>tunnel</b> <i>tunnel-id</i> | (Optional) Displays interface-level A-DSG downstream tunnel information. The valid range is from 1 to 65535.                                                                                                                                                                                                                                                                                                                                                                                               |

**Command Default** Displays configuration information for all DSG downstream channels on a cable interface.

**Command Modes** Privileged EXEC (#)

**Command History**

| Release      | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC  | This command was introduced to support A-DSG 1.1 on the Cisco uBR10012 router and Cisco uBR7200 series routers.                                                                                                                                                                                                                                                                                                                                              |
| 12.3(17a)BC  | This command was modified to support A-DSG 1.2 with the following changes: <ul style="list-style-type: none"> <li>• The <b>rule</b> keyword option is obsolete.</li> <li>• The tunnel group ID field (“TG id”) was added to the <b>show interfaces cable dsg downstream tunnel</b> form of the command.</li> <li>• The output display column headings of the <b>show interfaces cable dsg downstream tunnel</b> form of the command were changed.</li> </ul> |
| 12.2SCA      | This command was integrated into Cisco IOS Release 12.2SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                                                                                                                                                               |
| 12.2(33)SCB4 | This command was modified. The <b>show interface cable dsg downstream dcd</b> command output is changed to display interface level DCD statistics for all interfaces in the mac-domain such as cable interfaces, modular cable interfaces, and IC interfaces. The field IF name is added to the output to indicate the interface.                                                                                                                            |
| 12.2(33)SCE  | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards.                                                                                                                                                                                                                                              |
| 12.2(33)SCG  | This command was modified. Support for the following keywords was removed: <ul style="list-style-type: none"> <li>• <b>rule rule-id</b></li> <li>• <b>cfr</b></li> <li>• <b>clients</b></li> <li>• <b>verbose</b></li> </ul>                                                                                                                                                                                                                                 |

**Usage Guidelines**

To use the **show interface cable dsg downstream** command, the tunnel group must be configured globally and also at the cable interface.

**Table 212**      **Interface Density Information**

| CMTS Router      | Line Card          | Slot   | Subslot | Port   | Cable Interface Index |
|------------------|--------------------|--------|---------|--------|-----------------------|
| Cisco uBR10012   | Cisco uBR-MC3GX60V | 5 to 8 | 0 or 1  | 0 to 4 | 0 to 14               |
|                  | Cisco UBR-MC20X20V |        |         |        | 0 to 4                |
|                  | Cisco uBR10-MC5X20 |        |         |        |                       |
| Cisco uBR7225VXR | All                | 1 or 2 | —       | 0 or 1 | —                     |
| Cisco uBR7246VXR | All                | 3 to 6 | —       | 0 or 1 | —                     |



## Examples

### Example: Displaying Information for all A-DSG Downstreams on a Cable Interface

The following example illustrates A-DSG downstream configuration information and the number of DSG tunnels, classifiers, clients and vender specific parameters.

```
Router# show interface cable 6/0 dsg downstream
```

| chan | chFreq | chan | timer | init    | oper    | twoWay | oneWay | num  | num    | num | num    | num |
|------|--------|------|-------|---------|---------|--------|--------|------|--------|-----|--------|-----|
| list | index  | freq | index | timeout | timeout | timer  | timer  | rule | tunnel | cfr | client | vsp |
| 1    | 2      | 666  | 1     | 1       | 2       | 3      | 4      | 9    | 6      | 4   | 6      | 2   |
|      | 3      | 500  |       |         |         |        |        |      |        |     |        |     |

### Example: Displaying DCD Information for all A-DSG Downstreams on a Cable Interface

The following example illustrates the DCD statistics for the given downstream channel for A-DSG version 1.1. DCD TLV information displays if the **debug cable dsg** command is active. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2.

```
Router# show interface cable 6/0 dsg downstream dcd
```

| dcd   | num of dcd | num of dcd | num of dcd | num of   |
|-------|------------|------------|------------|----------|
| state | sent       | fail       | change cnt | fragment |
| en    | 282        | 0          | 1          | 1        |

The following example shows the output for A-DSG debugging while running the same command:

```
Router# debug cable dsg
```

```
Router# show interface cable 6/0 dsg downstream dcd
```

| dcd   | num of dcd | num of dcd | num of dcd | num of   |
|-------|------------|------------|------------|----------|
| state | sent       | fail       | change cnt | fragment |
| en    | 2139       | 0          | 1          | 1        |

```
Router#
```

```
00:35:58: DCD TLV last sent:
```

```
32390101 01020102 040E0302 09510100 02061111 11111111 05060100 5E010114
06020001 2B150803 12345612 3456789A BCDEF012 3456789A BCDEF032 26010102
02010104 0E030209 51010002 06111111 11111105 0601005E 01011E06 02000206
02000A32 18010103 02010104 04040200 01050601 005E0101 28060200 03321401
01040201 01040403 02070105 0601005E 01013232 14010105 02010104 04040200
02050601 005E0101 3C321401 01070201 01040404 02000605 0601005E 01011432
1E010108 02010104 0E030209 51010002 06111111 11111105 0601005E 01011432
35010114 02010104 0E030209 51010002 06111111 11111105 0601005E 0101142B
```

```
Router# 15080312 34561234 56789ABC DEF01234 56789ABC DEF01715 02020001 05010109
0C0504E6 6F6F6F03 046F6F6F 6F170F02 02000205 01010906 0504E601 0141170F
02020003 05010109 060504E6 01012817 0F020200 0A050101 09060504 E6010147
33230104 27B25A80 01041DCD 65000202 00010302 00020402 00030502 00042B05
08030022 22
```

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the “dcd Tx” field in support of A-DSG version 1.2 as shown below:

```
Router# show interfaces cable 5/0 dsg downstream dcd
```

| dcd   | dcd | num of dcd | num of dcd | num of dcd | num of   |
|-------|-----|------------|------------|------------|----------|
| state | Tx  | sent       | fail       | change cnt | fragment |
| en    | on  | 6502       | 0          | 28         | 1        |

The following output displays the DCD statistics on all the cable and modular interfaces. The “IF Name” field displays the interface type:

```
Router#show interface cable 5/1/0 dsg downstream dcd
```

| IF        | dcd   | dcd | num of dcd | num of dcd | num of dcd | num of   |
|-----------|-------|-----|------------|------------|------------|----------|
| Name      | state | Tx  | sent       | fail       | change cnt | fragment |
| Ca5/1/0   | en    | on  | 70         | 0          | 2          | 1        |
| Mo1/0/0:0 | en    | on  | 70         | 0          | 2          | 1        |

**Example: Displaying Rule Information for all A-DSG Downstreams on a Cable Interface****Note**

This command is obsolete beginning in Cisco IOS Release 12.3(17a)BC.

Router# **show interface cable 6/0 dsg downstream rule**

| rule id | rule state | rule pri | tunnel id | tunnel state | tunnel mac-addr | cfr id | cfr state | cfrIn dcd | client listId | vsp index |
|---------|------------|----------|-----------|--------------|-----------------|--------|-----------|-----------|---------------|-----------|
| 1       | en         | 2        | 1         | en           | 0100.5e01.0114  | 1      | en        | yes       | 2             | 1         |
|         |            |          |           |              |                 | 5      | en        | no        |               |           |
|         |            |          |           |              |                 | 11     | en        | no        |               |           |
|         |            |          |           |              |                 | 14     | en        | no        |               |           |
| 2       | en         | 1        | 2         | en           | 0100.5e01.011e  | 2      | en        | yes       | 2             |           |
|         |            |          |           |              |                 | 10     | en        | yes       |               |           |
| 3       | en         | 1        | 3         | en           | 0100.5e01.0128  | 3      | en        | yes       | 3             |           |
| 4       | en         | 1        | 4         | en           | 0100.5e01.0132  | 4      | en        | no        | 4             |           |
| 5       | en         | 1        | 5         | en           | 0100.5e01.013c  | 9      | en        | no        | 5             |           |
| 6       | en         | 1        | 6         | dis          | 0100.5e01.0146  |        |           |           | 6             | 2         |
| 7       | en         | 1        | 1         | en           | 0100.5e01.0114  | 1      | en        | no        | 10            |           |
|         |            |          |           |              |                 | 5      | en        | no        |               |           |
|         |            |          |           |              |                 | 11     | en        | no        |               |           |
|         |            |          |           |              |                 | 14     | en        | no        |               |           |
| 8       | en         | 1        | 1         | en           | 0100.5e01.0114  | 1      | en        | no        | 2             |           |
|         |            |          |           |              |                 | 5      | en        | no        |               |           |
|         |            |          |           |              |                 | 11     | en        | no        |               |           |
|         |            |          |           |              |                 | 14     | en        | no        |               |           |
| 20      | en         | 1        | 1         | en           | 0100.5e01.0114  | 1      | en        | no        | 2             | 1         |
|         |            |          |           |              |                 | 5      | en        | no        |               |           |
|         |            |          |           |              |                 | 11     | en        | no        |               |           |
|         |            |          |           |              |                 | 14     | en        | no        |               |           |
|         |            |          |           |              |                 | 65535  | dis       | yes       |               |           |

The following example displays the same information as above for the given rule.

Router# **show interface cable 6/0 dsg downstream rule 1**

| rule id | rule state | rule pri | tunnel id | tunnel state | tunnel mac-addr | cfr id | cfr state | cfrIn dcd | client listId | vsp index |
|---------|------------|----------|-----------|--------------|-----------------|--------|-----------|-----------|---------------|-----------|
| 1       | en         | 2        | 1         | en           | 0100.5e01.0114  | 1      | en        | yes       | 2             | 1         |
|         |            |          |           |              |                 | 5      | en        | no        |               |           |
|         |            |          |           |              |                 | 11     | en        | no        |               |           |
|         |            |          |           |              |                 | 14     | en        | no        |               |           |

Router# **show interface cable 6/0 dsg downstream rule 1 cfr**

| rule id | cfr id | cfr state | cfrIn dcd | cfr pri | destination address | source ip address | srcPre length | d_port start | d_port end |
|---------|--------|-----------|-----------|---------|---------------------|-------------------|---------------|--------------|------------|
| 1       | 1      | en        | yes       | 1       | 230.111.111.111     | 111.111.111.111   | 32            | 0            | 65535      |
|         | 5      | en        | no        | 1       | 230.1.1.60          | 0.0.0.0           | 32            | 0            | 65535      |
|         | 11     | en        | no        | 1       | 224.25.25.134       | 0.0.0.0           | 32            | 0            | 65535      |
|         | 14     | en        | no        | 0       | 230.1.1.20          | 0.0.0.0           | 32            | 1000         | 2000       |

Router# **show interface cable 6/0 dsg downstream rule 1 clients**

| rule id | rule state | rule pri | client listId | client id | client id type | client address |
|---------|------------|----------|---------------|-----------|----------------|----------------|
| 1       | en         | 2        | 2             | 1         | CA System ID   | 0951           |
|         |            |          |               | 3         | Broadcast      |                |
|         |            |          |               | 8         | MAC Addr       | 1111.1111.111  |

Router# **show interface cable 6/0 dsg downstream rule 1 verbose**

```

Rule ID : 1
State : enable
Priority : 2

Tunnel ID : 1
State : enable
MAC Addr : 0100.5e01.0114

```

```

Cfr Id : 1
State : enable
Priority : 1
Dest IP : 230.111.111.111
Src IP : 111.111.111.111
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 5
State : enable
Priority : 1
Dest IP : 230.1.1.60
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 11
State : enable
Priority : 1
Dest IP : 224.25.25.134
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 0
Dest Port End : 65535
Forwarded : 0
Received : 0

Cfr Id : 14
State : enable
Priority : 0
Dest IP : 230.1.1.20
Src IP : 0.0.0.0
Src Prefix Length : 32
Dest Port Start : 1000
Dest Port End : 2000
Forwarded : 0
Received : 0

Client List Id : 2
Client Id : 1
Client Id Type : CA System ID 0951
Client Id : 3
Client Id Type : Broadcast
Client Id : 8
Client Id Type : MAC Addr 1111.1111.111

vsif index : 1
vsif oui : 0X123456
vsif value : 0X123456789ABCDEF0123456789ABCDEF0

```

### Example: Displaying Tunnel Information for all A-DSG Downstream s on a Cable Interface

The following examples shows output for tunnels on A-DSG version 1.1 downstreams. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2.

Router# **show interface cable 6/0 dsg downstream tunnel**

| tunnel id | tunnel state | tunnel mac-addr | cfr id | cfr state | rule id | rule state | client listId | service class |
|-----------|--------------|-----------------|--------|-----------|---------|------------|---------------|---------------|
| 1         | en           | 0100.5e01.0114  | 1      | en        | 1       | en         | 2             | SI            |
|           |              |                 | 5      | en        | 7       | en         | 10            |               |
|           |              |                 | 11     | en        | 8       | en         | 2             |               |
|           |              |                 | 14     | en        | 20      | en         | 2             |               |

## show interface cable dsg downstream

```

2 en 0100.5e01.011e 2 en 2 en 2 NDS-CA
10
3 en 0100.5e01.0128 3 en 3 en 3 NDS-APP
4 en 0100.5e01.0132 4 en 4 en 4 MOTO-CA
5 en 0100.5e01.013c 9 en 5 en 5 MOTO-APP
6 dis 0100.5e01.0146 6 en 6 en 6 SA-CA

```

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the “TG id” field in support of A-DSG version 1.2, and modifies the output column headings as shown below:

```

Router# show interfaces cable 5/0 dsg downstream tunnel
 tunnel TG cfr rule client service
id state mac-addr id id state id state listId class
1 en 0100.5e01.0001 1 1 en 1 en 1 DSG-Rate1
6 en
7 en
8 en
2 en 0100.5e01.0002 1 2 en 2 en 2
3 en 0100.5e01.0003 1 3 en 3 en 3
4 en 0002.0002.0001 2 4 en 4 en 1
5 en 0002.0002.0002 2 5 en 5 en 2 DSG-Rate2
6 en 0002.0002.0003 2 9 en 6 en 21

```

### Example: Displaying Information for a Specified Tunnel on A-DSG Downstream s on a Cable Interface

The following examples shows output for a specified tunnel on A-DSG version 1.1 downstreams. This output was changed in Cisco IOS Release 12.3(17a)BC for A-DSG version 1.2.

```

Router# show interface cable 6/0 dsg downstream tunnel 1

tunnel tunnel tunnel cfr cfr rule rule client service
id state mac-addr id id state id state listId class
1 en 0100.5e01.0114 1 5 en 7 en 10 SI
11 en 8 en 2
14 en 20 en 2

```

Beginning in Cisco IOS Release 12.3(17a)BC, this output was modified to add the “TG id” field in support of A-DSG version 1.2, and modifies the output column headings as shown below:

```

Router# show interfaces cable 5/0 dsg downstream tunnel 1
 tunnel TG cfr rule client service
id state mac-addr id id state id state listId class
1 en 0100.5e01.0001 1 1 en 1 en 1 DSG-Rate1
6 en
7 en
8 en

```

## Related Commands

| Command                                       | Description                                                                     |
|-----------------------------------------------|---------------------------------------------------------------------------------|
| <b>debug cable dsg</b>                        | Enables general, DCD or packet-related debugging.                               |
| <b>show interface</b>                         | Displays general interface information for the specified or all interfaces.     |
| <b>show interface cable dsg downstream tg</b> | Displays information for A-DSG downstream tunnel groups on a Cisco CMTS router. |

# show interface cable dsg downstream tg

To display information for Advanced-mode DOCSIS Set-top Gateway (A-DSG) downstream tunnel groups on a Cisco CMTS router, use the **show interface cable dsg downstream tg** command in privileged EXEC mode.

**show interface cable** { *slot/port* | *slot/subslot/port* } **dsg downstream tg** [**channel** *channel-id*]

**Cisco IOS Release 12.2(33)SCE and later**

**show interface cable** { *slot/cable-interface-index* | *slot/subslot/cable-interface-index* } **dsg downstream tg** [**channel** *channel-id*]

| Syntax                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                      | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                 |
| <i>subslot</i>                   | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| <i>port</i>                      | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                               |
| <i>cable-interface-index</i>     | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |
| <b>channel</b> <i>channel-id</i> | (Optional) Specifies the downstream channel identifier as a number from 1–65535.                                                                                                                                                                                                                                                                                                                                                             |

**Command Default** No default behaviors or values.

**Command Modes** Privileged EXEC (#)

## show interface cable dsg downstream tg

### Command History

| Release      | Modification                                                                                                                                                                                                    |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC  | This command was introduced to support A-DSG on the Cisco uBR10012 router and Cisco uBR7200 series routers.                                                                                                     |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                              |
| 12.2(33)SCD5 | This command was modified. The output of the <b>show interface cable dsg downstream tg</b> command was changed.                                                                                                 |
| 12.2(33)SCE  | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

### Usage Guidelines

To use the **show interface cable dsg downstream tg** command, the tunnel group must be configured globally and also at the cable interface.

### Examples

#### Example: Displaying Information for all A-DSG Downstream Tunnel Groups on a Cable Interface

The following example shows output for all A-DSG downstream tunnel groups:

```
Router# show interfaces cable 5/0 dsg downstream tg
TG: 1 Chan: 1 state: en pri: 16 Vendor: 1 UCID: 1 2 3 4

 rule tunnel cfr client
I/F id state id state mac-addr id state dest-ip In-DCD listId
C5/0 1 en 1 en 0101.5e01.0001 1 en 230.1.0.1 yes 1
 6 en 231.1.1.6 no
 7 en 231.1.1.7 no
 8 en 231.1.1.8 no
 2 en 2 en 0101.5e01.0002 2 en 230.1.0.2 yes 2
 3 en 3 en 0101.5e01.0003 3 en 230.1.0.3 yes 3

TG: 2 Chan: 1 state: en pri: 11 Vendor: 2 UCID:

 rule tunnel cfr client
I/F id state id state mac-addr id state dest-ip In-DCD listId
C5/0 4 en 4 en 0002.0002.0001 4 en 230.2.2.1 no 1
 5 en 5 en 0002.0002.0002 5 en 230.2.2.2 no 2
 6 en 6 en 0002.0002.0003 9 en 231.1.1.9 no 21
```

#### Example: Displaying Information for a Specified A-DSG Downstream Tunnel Group on a Cable Interface

The following example shows output for a specified A-DSG downstream tunnel group:

```
Router# show interfaces cable 5/0 dsg downstream tg 1 channel 1
TG: 1 Chan: 1 state: en pri: 16 Vendor: 1 UCID: 1 2 3 4

 rule tunnel cfr client
I/F id state id state mac-addr id state dest-ip In-DCD listId
C5/0 1 en 1 en 0101.5e01.0001 1 en 230.1.0.1 yes 1
 6 en 231.1.1.6 no
 7 en 231.1.1.7 no
 8 en 231.1.1.8 no
 2 en 2 en 0101.5e01.0002 2 en 230.1.0.2 yes 2
 3 en 3 en 0101.5e01.0003 3 en 230.1.0.3 yes 3
```

**Example: Displaying Information for a Specified A-DSG Downstream Tunnel Group on a Cable Interface for Cisco IOS Release 12.2(33)SCD5**

The following example shows the output of the **show interfaces cable dsg downstream tg** command that displays the **ignore** option, introduced in Cisco IOS Release 12.2(33)SCD5, under the ‘In DCD’ column.

```
Router# show interfaces cable 7/0/0 dsg downstream tg

TG: 1 Chan: 1 State: en Pri: 0 Vendor: UCID:

 rule tunnel cfr In clients
id state id state mac-addr id state dest-ip DCD listId

1 en 1 en 0100.5e01.0101 1 en 230.1.1.1 ign 1
```

| Related Commands | Command                             | Description                                                                                           |
|------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------|
|                  | debug cable dsg                     | Enables general, DCD or packet-related debugging.                                                     |
|                  | show interface                      | Displays general interface information for the specified or all interfaces.                           |
|                  | show interface cable dsg downstream | Displays interface configuration and status information for A-DSG downstreams on a Cisco CMTS router. |
|                  |                                     |                                                                                                       |

# show interface cable dynamic-service statistics

To display dynamic service statistics based on the cable interface, use the **show interface cable dynamic-service statistics** command in privileged EXEC mode.

```
show interface cable {slot/cable-interface-index | slot/subslot/cable-interface-index}
dynamic-service statistics
```

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <div> <div>slot</div> <div>Slot where the line card resides.</div> <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul> </div>                                                                                                                                                                                                                                     |
|                    | <div> <div>cable-interface-index</div> <div>Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards.</div> <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> </div> |
|                    | <div> <div>subslot</div> <div>(Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.</div> </div>                                                                                                                                                                                                                                                                                                                                                                                            |

Command Default      None

Command Modes      Privileged EXEC (#)

|                 |                               |                              |
|-----------------|-------------------------------|------------------------------|
| Command History | Release                       | Modification                 |
|                 | Cisco IOS Release 12.2(33)SCF | This command was introduced. |

**Examples**      The following is a sample output of the **show interface cable dynamic-service statistics** command that shows dynamic service statistics based on the cable interface specified on the Cisco uBR10012 router in Cisco IOS Release 12.2(33)SCF:

```
Router# show interface cable 7/1/0 dynamic-service statistics

 Upstream Downstream
DSA REQ 0 5
DSA RSP 5 0
DSA ACK 0 5
DSC REQ 0 5
DSC RSP 5 0
DSC ACK 0 5
```



```

DSD REQ 0 0
DSD RSP 0 0

Retransmission counts
 Upstream Downstream
DSA REQ 0 0
DSA RSP 0 0
DSA ACK 0 0
DSC REQ 0 5
DSC RSP 5 0
DSC ACK 0 0
DSD REQ 0 0
DSD RSP 0 0

```

[Table 213](#) describes the significant fields shown in the **show interface cable dynamic-service statistics** command display.

**Table 213** *show interface cable dynamic-service statistics Field Descriptions*

| Field      | Description                                               |
|------------|-----------------------------------------------------------|
| Upstream   | Dynamic service packets sent in the upstream direction.   |
| Downstream | Dynamic service packets sent in the downstream direction. |
| DSA RSP    | Dynamic service add response.                             |
| DSA ACK    | Dynamic service add acknowledgement.                      |
| DSC REQ    | Dynamic service change request.                           |
| DSC RSP    | Dynamic service change response.                          |
| DSC ACK    | Dynamic service change acknowledgement.                   |
| DSD REQ    | Dynamic service delete request.                           |
| DSD RSP    | Dynamic service delete response.                          |

#### Related Commands

| Command                                            | Description                                                                                              |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>show interface cable packetcable statistics</b> | Displays PacketCable interprocess communication (IPC) statistics based on the specified cable interface. |

# show interface cable intercept

To display the cable modems for which traffic is currently being intercepted and forwarded to a data collector, use the **show interface cable intercept** command in privileged EXEC mode.

```
show interface cable {slot/port | slot/subslot/port | bundle} intercept
```

Cisco IOS Release 12.2(33)SCE and later

```
show interface cable {slot/cable-interface-index | slot/subslot/cable-interface-index | bundle}
intercept
```

| Syntax                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li><li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li><li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li></ul>                                                                                                                                                                     |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li><li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li></ul>                                                                                                                                                                                  |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards.<br><br>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.<br><br>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14. |
| <i>bundle</i>                | Identifies the bundle ID on the Cisco uBR7100 series, the Cisco uBR7200 series and the Cisco uBR10000 series routers where the interface has been configured to be a member of a virtual interface bundle.<br><br>The valid range is 1 to 255.                                                                                                                                                                                               |

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release   | Modification                                      |
|-----------------|-----------|---------------------------------------------------|
|                 | 12.0(5)T1 | This command was introduced.                      |
|                 | 12.0(6)SC | This command was introduced on the 12.0 SC train. |

| Release     | Modification                                                                                                                                                                                                    |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(2)EC   | This command was introduced on 12.1 EC train.                                                                                                                                                                   |
| 12.2(4)BC1  | This command was introduced on the 12.2 BC train.                                                                                                                                                               |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                                                 |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

## Examples

The following shows a display after a CM has been added to the intercept list:

```
router# configure terminal
router#(config) interface c6/0
router(config-if)# cable intercept 0080.fcaa.aabb 10.12.13.8 512
router(config-if)# exit
router(config)# exit
router# show interface c6/0 intercept
```

|                | Destination | Destination |
|----------------|-------------|-------------|
| MAC Address    | IP Address  | UDP Port    |
| 0080.fcaa.aabb | 3.12.13.8   | 512         |

The following shows a display when no CMs have been added to the intercept list:

```
router# show interface c6/0 intercept
```

No interception active



### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

## Related Commands

| Command                | Description                                                                                       |
|------------------------|---------------------------------------------------------------------------------------------------|
| <b>cable intercept</b> | Specifies that a copy of all traffic for a particular CM should be forwarded to a data collector. |

# show interface cable mac-scheduler

To display the current time-slot scheduling state, statistics, and weighted fair queuing (WFQ) parameters, use the **show interface cable mac-scheduler** command in privileged EXEC mode.

```
show interface cable { slot/port | slot/subslot/port } mac-scheduler [n]
```

Cisco IOS Release 12.2(33)SCE and later

```
show interface cable { slot/cable-interface-index | slot/subslot/cable-interface-index }
mac-scheduler [n]
```

|                    |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | slot/port             | <p>Cable interface and downstream port on the Cisco uBR7200 series routers:</p> <ul style="list-style-type: none"> <li>slot—Slot where the line card resides: <ul style="list-style-type: none"> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> </ul> </li> <li>port—Downstream port number: <ul style="list-style-type: none"> <li>Cisco uBR7246VXR and Cisco uBR7225VXR routers— The valid value is 0 or 1.</li> </ul> </li> </ul>                               |
|                    | slot/subslot/port     | <p>Cable interface on the Cisco uBR10012 router:</p> <ul style="list-style-type: none"> <li>slot—Chassis slot number of the cable interface line card. The valid range is from 5 to 8.</li> <li>subslot—Secondary slot number of the cable interface line card. The valid range is 0 or 1.</li> <li>port—Downstream port number. The valid ports are from 0 to 4, depending on the cable interface line card.</li> </ul>                                                                                                                         |
|                    | cable-interface-index | <p>Downstream port of the Cisco uBR10-MC5X20U/H and Cisco uBR-MC28U line cards or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards.</p> <ul style="list-style-type: none"> <li>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router: <ul style="list-style-type: none"> <li>Cisco UBR-MC20X20V and Cisco uBR10-MC5X20U/H line cards—The valid range is from 0 to 4.</li> <li>Cisco uBR-MC3GX60V line card—The valid range is from 0 to 14.</li> </ul> </li> </ul> |
|                    | n                     | <p>(Optional) Specific upstream to be displayed. The valid values start with 0 for the first upstream port on the cable interface line card.</p>                                                                                                                                                                                                                                                                                                                                                                                                 |

|                 |                                                                                                                                                                                                                                                 |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command Default | <p>If no upstream port is identified, the command displays information for all upstreams on the specified cable interface. If no <i>logical-index</i> is identified, the command displays all the logical channels under the physical port.</p> |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Command Modes** Privileged EXEC (#)

| Command History | Release      | Modification                                                                                                                                                                                                                                                                                                                 |
|-----------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(4)CX    | This command was introduced. (Much of the information shown in this command was previously shown by the <b>show interface cable</b> and <b>show interface cable upstream</b> commands.)                                                                                                                                      |
|                 | 12.2(4)BC1   | Support was added to the Cisco IOS Release 12.2 BC train.                                                                                                                                                                                                                                                                    |
|                 | 12.2(15)CX   | Support was added for the Cisco uBR-MC28U/X cable interface line card, including additional information about DOCSIS 2.0 A-TDMA and mixed modulation profiles.                                                                                                                                                               |
|                 | 12.2(15)BC2  | Additional information was added to the display for DOCSIS 2.0 A-TDMA and mixed modulation profiles on the Cisco uBR10-MC5X20S cable interface line card.                                                                                                                                                                    |
|                 | 12.3BC       | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                                                                                                                   |
|                 | 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                                                                                                           |
|                 | 12.2(33)SCC  | This command was modified. The command output was modified to show logical channels information when multiple logical channels are configured.                                                                                                                                                                               |
|                 | 12.2(33)SCD2 | This command was modified. The command output was modified to show weighted fair queuing (WFQ) parameters configured for upstream service flows.                                                                                                                                                                             |
|                 | 12.2(33)SCE  | This command was modified. The command output was modified to show the upstream scheduler output for a MAC domain configured with DPON. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

**Usage Guidelines** In releases prior to Cisco IOS Release 12.2 BC, information for the MAC scheduler was displayed using the **show interface cable** and **show interface cable upstream** commands. In Cisco IOS Release 12.2 BC, the MAC scheduler information is moved to this command.

**Examples** **Example of the show interface cable mac-scheduler Command Output for the Cisco uBR7246VXR and Cisco uBR7225VXR Routers**

The following is a sample output of the **show interface cable mac-scheduler** command for the upstream port 0 on the indicated cable interface:

```
Router# show interface cable 3/0 mac-scheduler 0
```

```
DOCSIS 1.1 MAC scheduler for Cable3/0/U0
Queue[Rng Polls] 0/64, 0 drops
Queue[CIR Grants] 0/64, 0 drops
Queue[BE(7) Grants] 0/64, 0 drops
Queue[BE(6) Grants] 0/64, 0 drops
Queue[BE(5) Grants] 0/64, 0 drops
Queue[BE(4) Grants] 0/64, 0 drops
Queue[BE(3) Grants] 0/64, 2 drops
Queue[BE(2) Grants] 0/64, 0 drops
```

**show interface cable mac-scheduler**

```

Queue[BE(1) Grants] 0/64, 0 drops
Queue[BE(0) Grants] 0/64, 0 drops
Req Slots 21992195, Req/Data Slots 0
Init Mtn Slots 313764, Stn Mtn Slots 37638
Short Grant Slots 3739132, Long Grant Slots 512
Fragmentation count 5
Fragmentation test disabled
Avg upstream channel utilization : 2%
Avg percent contention slots : 96%
Avg percent initial ranging slots : 1%
Avg percent minislots lost on late MAPs : 0%
Sched Table Adm-State: Grants 1, Reqpolls 0, Util 2%
UGS : 1 SIDs, Reservation-level in bps 80000
UGS-AD : 0 SIDs, Reservation-level in bps 0
RTPS : 0 SIDs, Reservation-level in bps 0
NRTPS : Not Supported
BE : 4 SIDs, Reservation-level in bps 0

```

### Example of the show interface cable mac-scheduler Command Output When Multiple Logical Channels are Configured for the Cisco uBR10012 Routers

The following is a sample output of the **show interface cable mac-scheduler** command when multiple logical channels are configured on the indicated cable interface:

Router# **show interface cable 7/1/0 mac-scheduler 0**

```

DOCSIS 1.1 MAC scheduler for Cable7/1/0/U0: rate 2560000
wfq:None Fairness: Off
Queue[Rng Polls] 0/128, 0 drops, flows 0 fs_demand_ms 0, max 1
Queue[CIR Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(7) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(6) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(5) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(4) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(3) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(2) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(1) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(0) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Req Slots 10348117, Req/Data Slots 10072546
Init Mtn Slots 298967, Stn Mtn Slots 21926
Short Grant Slots 24, Long Grant Slots 16
Adv Phy Short Grant Slots 0, Adv Phy Long Grant Slots 0
Adv Phy UGS Grant Slots 0
Awacs Slots 0
Fragmentation count 0
Fragmentation test disabled
Avg upstream channel utilization : 0%
Avg percent contention slots : 97%
Avg percent initial ranging slots : 3%
Avg percent minislots lost on late MAPs : 0%
Sched Table Rsv-state: Grants 0, Reqpolls 0
Sched Table Adm-State: Grants 0, Reqpolls 0, Util 0%
UGS : 0 SIDs, Reservation-level in bps 0
UGS-AD : 0 SIDs, Reservation-level in bps 0
RTPS : 0 SIDs, Reservation-level in bps 0
NRTPS : 0 SIDs, Reservation-level in bps 0
BE : 4 SIDs, Reservation-level in bps 0

MAP TSS: lch_state 11, init_retries 0
 late_initial_maps 0, late_ucd_maps 0
 mac-phy tss errors 0

DOCSIS 1.1 MAC scheduler for Cable7/1/0/U8: rate 2560000

```

```

wfq:None Fairness: Off
Queue[Rng Polls] 0/128, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[CIR Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(7) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(6) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(5) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(4) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(3) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(2) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(1) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Queue[BE(0) Grants] 0/256, 0 drops, flows 0 fs_demand_ms 0, max 0
Req Slots 0, Req/Data Slots 0
Init Mtn Slots 0, Stn Mtn Slots 0
Short Grant Slots 0, Long Grant Slots 0
Adv Phy Short Grant Slots 0, Adv Phy Long Grant Slots 0
Adv Phy UGS Grant Slots 0
Awacs Slots 0
Fragmentation count 0
Fragmentation test disabled
Avg upstream channel utilization : 0%
Avg percent contention slots : 0%
Avg percent initial ranging slots : 0%
Avg percent minislots lost on late MAPs : 0%
Sched Table Rsv-state: Grants 0, Reqpolls 0
Sched Table Adm-State: Grants 0, Reqpolls 0, Util 0%
UGS : 0 SIDs, Reservation-level in bps 0
UGS-AD : 0 SIDs, Reservation-level in bps 0
RTPS : 0 SIDs, Reservation-level in bps 0
NRTPS : 0 SIDs, Reservation-level in bps 0
BE : 0 SIDs, Reservation-level in bps 0

MAP TSS: lch_state 1, init_retries 0
 late_initial_maps 0, late_ucd_maps 0
 mac-phy tss errors 0

```

### Example of the show interface cable mac-scheduler Command Output That Displays WFQ Parameters in the Cisco uBR10012 Router

The following is a sample output of the **show interface cable mac-scheduler** command that displays WFQ parameters configured for upstream service flows in slot 5, subslot 0, and port 1 on a Cisco uBR10012 router:

```

Router# show interface cable 5/0/2 mac-scheduler 0

DOCSIS 1.1 MAC scheduler for Cable5/0/2/U0: rate 10240000
wfq:Class, weights: 1 2 3 4 5 6 7 8
Queue[Rng Polls] 0/128, 0 drops, flows 0 max 0
Queue[CIR Grants] 0/256, 0 drops, flows 0 max 0
Queue[BE(7) Grants] 0/32, 0 drops, flows 0 max 0
Queue[BE(6) Grants] 0/32, 0 drops, flows 0 max 0
Queue[BE(5) Grants] 0/32, 0 drops, flows 0 max 0
Queue[BE(4) Grants] 0/32, 0 drops, flows 0 max 0
Queue[BE(3) Grants] 0/32, 0 drops, flows 0 max 0
Queue[BE(2) Grants] 0/32, 0 drops, flows 0 max 0
Queue[BE(1) Grants] 0/32, 0 drops, flows 0 max 0
Queue[BE(0) Grants] 0/32, 0 drops, flows 0 max 0
Queue[LLQ Grants] 0/64, 0 drops, flows 0 max 0
BG pending grant list entries: 0
BG delay list entries: 0
Req Slots 265389868, Req/Data Slots 4
Init Mtn Slots 3798558, Stn Mtn Slots 0
Short Grant Slots 0, Long Grant Slots 0
Adv Phy Short Grant Slots 0, Adv Phy Long Grant Slots 0

```

## show interface cable mac-scheduler

```

Adv Phy UGS Grant Slots 0
Awacs Slots 0
Fragmentation count 0
Fragmentation test disabled
Avg upstream channel utilization : 0%
Avg percent contention slots : 97%
Avg percent initial ranging slots : 3%
Avg percent minislots lost on late MAPs : 0%
Sched Table Rsv-state: Grants 0, Reqpolls 0
Sched Table Adm-State: Grants 0, Reqpolls 0, Util 0%
UGS : 0 SIDs, Reservation-level in bps 0
UGS-AD : 0 SIDs, Reservation-level in bps 0
RTPS : 0 SIDs, Reservation-level in bps 0
NRTPS : 0 SIDs, Reservation-level in bps 0
BE : 0 SIDs, Reservation-level in bps 0
MAP TSS: lch_state 11, init_retries 0
late_initial_maps 0, late_ucd_maps 0
mac-phy tss errors 0
r4k ticks in 1ms 800000
Total scheduling events 0
No search was needed 0
Previous entry free 0
Next entry free 0
Could not schedule 0
Recovery failed 0
Curr time 251 entry 251

```

### Example of the show interface cable mac-scheduler Command Output That Displays Upstream Scheduler Information for a MAC Domain Configured with D-PON

The following is a sample output of the **show interface cable mac-scheduler** command that displays upstream scheduler related information for a MAC domain configured with D-PON:

```
Router# show interface cable 7/0/2 mac-scheduler 1
```

```

DOCSIS 1.1 MAC scheduler for Cable7/0/2/U1: rate 15360000
wfg:None
Req Slots 124, Req/Data Slots 13
Init Mtn Slots 2243, Stn Mtn Slots 5
Short Grant Slots 0, Long Grant Slots 0
Adv Phy Short Grant Slots 1, Adv Phy Long Grant Slots 0
Adv Phy UGS Grant Slots 0
Awacs Slots 0
Fragmentation count 0
Fragmentation test disabled
Avg upstream channel utilization : 0%
Avg percent contention slots : 97%
Avg percent initial ranging slots : 3%
Avg percent minislots lost on late MAPs : 0%
Sched Table Rsv-state: Grants 0, Reqpolls 0
Sched Table Adm-State: Grants 0, Reqpolls 0, Util 0%
UGS : 0 SIDs, Reservation-level in bps 0
UGS-AD : 0 SIDs, Reservation-level in bps 0
RTPS : 0 SIDs, Reservation-level in bps 0
NRTPS : 0 SIDs, Reservation-level in bps 0
BE : 0 SIDs, Reservation-level in bps 0

MAP TSS: lch_state 13, init_retries 0
 late_initial_maps 0, late_ucd_maps 0
 mac-phy tss errors 0
! Only the DPON reference channel will display the following
Queue[Rng Polls] 0/128, 0 drops, flows 0 max 3
Queue[CIR Grants] 0/256, 0 drops, flows 0 max 1

```



```

Queue[BE(7) Grants] 0/64, 0 drops, flows 0 max 0
Queue[BE(6) Grants] 0/64, 0 drops, flows 0 max 0
Queue[BE(5) Grants] 0/64, 0 drops, flows 0 max 0
Queue[BE(4) Grants] 0/64, 0 drops, flows 0 max 0
Queue[BE(3) Grants] 0/64, 0 drops, flows 0 max 0
Queue[BE(2) Grants] 0/64, 0 drops, flows 0 max 2
Queue[BE(1) Grants] 0/64, 0 drops, flows 0 max 0
Queue[BE(0) Grants] 0/64, 0 drops, flows 0 max 1
BG pending grant list entries: 0
BG delay list entries: 0

```

Table 1 describes the significant fields shown in the display.

**Table 214** *show interface cable mac-scheduler Field Descriptions*

| Field             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| wfq               | WFQ parameters: class, activity, and custom weights for service flow priorities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Queue...          | <p>State of the first-in, first-out (FIFO) priority queues for each scheduler. For each queue, the command displays the following:</p> <ul style="list-style-type: none"> <li>Name of the queue. The following queues are available: <ul style="list-style-type: none"> <li>Rng Polls—Queue used for ranging requests.</li> <li>CIR Grants—Queue used for committed information rate (CIR) grants, which is used for Unsolicited Grant Service (UGS) and UGS with Activity Detection (UGS-AD) service flows.</li> <li>BE(x) Grants—One of the eight queues used for Best-Effort(BE) service flows.</li> </ul> </li> <li>Number of currently occupied slots over the total number of slots available (which is hardcoded to 64 for each queue). For example, 3/64 indicates that the queue has a depth of 64 slots available and that 3 are currently in use.</li> <li>Number of packets dropped because the queue already had 64 requests pending and a free slot was therefore not available.</li> </ul> |
| Req Slots         | Counter showing the number of slots advertised on this upstream port for bandwidth request opportunities since the last reset of the router or the counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Req/Data          | Counter showing the number of slots advertised on this upstream port for request and data transmission opportunities since the last reset of the router or the counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Init Mtn Slots    | Number of slots granted on this upstream port for initial maintenance requests (initial ranging) since the last reset of the router or the counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Stn Mtn Slots     | Number of slots granted on this upstream port for station maintenance requests (unicast ranging) since the last reset of the router or the counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Short Grant Slots | Number of slots granted on this upstream port for short data requests since the last reset of the router or the counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Long Grant Slots  | Number of slots granted on this upstream port for long data requests since the last reset of the router or the counter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 214**      *show interface cable mac-scheduler Field Descriptions (continued)*

| Field                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adv Phy Short Grant Slots               | Number of slots granted on this upstream port for short advanced physical data requests.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Adv Phy Long Grant Slots                | Number of slots granted on this upstream port for long advanced physical data requests.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Adv Phy UGS Grant Slots                 | Number of UGS slots granted on this upstream port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Awacs Slots                             | Number of awacs slots granted on this upstream port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Fragmentation count                     | Number of frames received on this upstream port fragmented according to the DOCSIS 1.1 fragmentation technique.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Fragmentation test                      | Fragmentation statistics. If fragmentation is disabled, no statistics are available. If fragmentation is enabled, the fragmentation mode is displayed (multiple grant mode or piggyback mode), and the display shows the fragmentation threshold in the number of bytes and minislots.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Avg upstream channel utilization        | <p>Total upstream bandwidth currently used for upstream data traffic and DOCSIS management traffic, expressed as a short-term average percentage of total minislots used.</p> <p><b>Note</b>    Table 2 shows the theoretical maximum possible bandwidth for an upstream, based on the channel width and modulation scheme.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Avg percent contention slots            | <p>Approximate average unused capacity in the network. This field shows the total upstream bandwidth that is currently dedicated to providing bandwidth request opportunities, expressed as an average percentage of total minislots used. This value is calculated by dividing the number of scheduled contention slots by the total number of minislots.</p> <p><b>Note</b>    This value is approximately 100 percent minus the percentage of slots being used for upstream data, management traffic, and initial ranging slots.</p>                                                                                                                                                                                                                                                                                                                      |
| Avg percent initial ranging slots       | Total upstream bandwidth currently used on an average for initial ranging requests for cable modems coming online, expressed as an average percentage of total minislots used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Avg percent minislots lost on late MAPs | <p>Total upstream bandwidth currently lost and unused because the bandwidth allocation MAP message was sent late. This field shows how often allocation gaps occur in the MAP scheduler, where the Cisco CMTS allows significant amounts of time to pass before it schedules a new MAP.</p> <p>Ideally, the CMTS should schedule MAPs consecutively, so that no gaps occur between the MAPs. However, when a large number of cable modems are using different service flow schedules, gaps can appear in the MAP scheduler, resulting in wasted scheduling time.</p> <p><b>Tip</b>      A typical value is only a few percentage points. If this field shows larger values than this, use the <b>debug cable startalloc</b> command to display the number of minislots that are skipped every time the Cisco CMTS has to adjust its MAP scheduler timer.</p> |

**Table 214** *show interface cable mac-scheduler Field Descriptions (continued)*

| Field                 | Description                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sched Table Rsv-State | Current status of reserved service flows (which typically indicates the number of voice grants): <ul style="list-style-type: none"> <li>Grants—Number of admitted UGS style upstream service flows.</li> <li>Reqpolls—Number of admitted Real Time Polling Service (RTPS) style upstream service flows.</li> </ul>                                                             |
| Sched Table Adm-State | Current status of admitted service flows (which typically indicates the number of voice grants): <ul style="list-style-type: none"> <li>Grants—Number of admitted UGS style upstream service flows.</li> <li>Reqpolls—Number of admitted RTPS style upstream service flows.</li> <li>Percentage of channel utilization that is associated with these service flows.</li> </ul> |
| UGS                   | Number of service IDs (SIDs) used for UGS service flows, and the current bandwidth reserved by these SIDs, in bits per second.                                                                                                                                                                                                                                                 |
| UGS-AD                | Number of SIDs used for UGS with Activity Detection (UGS-AD) service flows, and the current bandwidth reserved by these SIDs, in bits per second.                                                                                                                                                                                                                              |
| RTPS                  | Number of SIDs used for RTPS service flows, and the current bandwidth reserved by these SIDs, in bits per second.                                                                                                                                                                                                                                                              |
| NRTPS                 | Number of SIDs used for non-RTPS (NRTPS) service flows, and the current bandwidth reserved by these SIDs, in bits per second.                                                                                                                                                                                                                                                  |
| BE                    | Number of SIDs used for best-effort (BE) service flows, and the current bandwidth reserved by these SIDs, in bits per second.                                                                                                                                                                                                                                                  |
| MAP TSS               | MAP timestamp snapshot.                                                                                                                                                                                                                                                                                                                                                        |

**Note**

The sum of *Avg upstream channel utilization* and *Avg percent contention slots* need not be 100 percentage when rate-adapt is configured. These parameters may be in single digit when the remaining contention slots are assigned to other users and are not using any bandwidth.

[Table 2](#) shows the maximum usable bandwidth (total bandwidth minus header and MAC-layer overhead) for an upstream that is using a specific channel width and modulation scheme combination.

**Table 215** *Maximum Potential Upstream Bandwidth*

| Channel Width (MHz) | Modulation Scheme | Raw Speed (Mbps) | Usable Bandwidth (Mbps) |
|---------------------|-------------------|------------------|-------------------------|
| 1.6                 | QPSK              | 2.56             | 2.2                     |
| 1.6                 | 16 QAM            | 5.12             | 4.4                     |
| 3.2                 | 16 QAM            | 10.24            | 8.9                     |
| 3.2                 | 64 QAM            | 15.36            | 13.5                    |

**Table 215**      **Maximum Potential Upstream Bandwidth**

| Channel Width (MHz) | Modulation Scheme | Raw Speed (Mbps) | Usable Bandwidth (Mbps) |
|---------------------|-------------------|------------------|-------------------------|
| 6.4                 | 16 QAM            | 20.48            | 18                      |
| 6.4                 | 64 QAM            | 30.72            | 27.2                    |

For example, if the upstream is configured for a 3.2 MHz channel width and is using 16 QAM modulation, its maximum usable bandwidth is 8.9 Mbps. If the average channel utilization field shows that the upstream is at 50 percent, it indicates that cable modems on that upstream are currently using  $0.5 * 8.9$  Mbps or 4.45 Mbps.

**Tip**

In Cisco IOS Release 12.1(12)EC, Cisco IOS Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in the line configuration mode.

**Related Commands**

| Command                                    | Description                                                                |
|--------------------------------------------|----------------------------------------------------------------------------|
| <b>show interface cable</b>                | Displays the configuration and status information for the cable interface. |
| <b>show interface cable sid</b>            | Displays SID information of each CM on the network.                        |
| <b>show interface cable signal-quality</b> | Displays the cable signal quality information.                             |
| <b>show interface cable upstream</b>       | Displays one or all of the cable interface upstream information.           |

# show interface cable modem

To display information about cable modems (CMs) and customer premise equipment (CPE) behind a CM on a specified cable interface, use the **show interface cable modem** command in privileged EXEC mode.

```
show interface cable { slot/port | slot/subslot/port } modem [sid | ipv6]
```

Cisco IOS Release 12.2(33)SCE and later

```
show interface cable { slot/cable-interface-index | slot/subslot/cable-interface-index } modem [sid | ipv6]
```

| Syntax Description | cable | Specifies details of a cable interface line card: <ul style="list-style-type: none"><li>slot—Slot where the line card resides.</li><li>subslot—(Cisco uBR10012 only) Secondary slot number of the line card.</li><li>port—Downstream port number of the line card.</li><li>cable-interface-index—Downstream port or MAC domain index of the line card.</li></ul> <p><a href="#">Table 216</a> in the Usage Guidelines section lists valid values for these arguments.</p> |
|--------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | sid   | (Optional) Specifies the service ID (SID) to be displayed. The valid range is from 0 to 8176.                                                                                                                                                                                                                                                                                                                                                                             |
|                    | ipv6  | (Optional) Specifies an IPv6 cable modem and connected host state.                                                                                                                                                                                                                                                                                                                                                                                                        |

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(11)BC2 | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>• Support for the Cisco uBR7225VXR router was added.</li> <li>• The “Dual IP” output field was added to indicate support of both IPv4 and IPv6 addressing.</li> <li>• Multicast information was added to the output.</li> <li>• The following new initialization states were added to show initialization of CMs and CPEs supporting IPv6: <ul style="list-style-type: none"> <li>– init6(s)—CMTS router has seen SOLICIT message</li> <li>– init6(a)—CMTS router has seen ADVERTISE message</li> <li>– init6(r)—CMTS router has seen REQUEST message</li> <li>– init6(i)—CMTS router has seen REPLY message</li> <li>– init6(o)—CMTS router has seen version 6 TFTP request</li> <li>– init6(t)—CMTS router has seen version 6 TOD request</li> </ul> </li> </ul> |
|                 | 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                 | 12.2(33)SCG | The <b>ipv6</b> keyword was added to this command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

### Usage Guidelines

The **show interface cable modem** command displays the cable modems that are known to be using or were last using the specified cable interface. When a cable modem goes offline, it remains associated with its last known cable interface and is shown as “offline” in the command’s display for 24 hours.

The CPE devices associated with offline cable modems remain in the command’s display either until their cable modem has been offline for 24 hours or until the device’s Address Resolution Protocol (ARP) entry times out (the default value is 4 hours), whichever comes first.

The **show interface cable modem** command shows similar information to the **show cable modem** command, but adds information about the privacy bits and IP addressing method.

The **show interface cable modem** command with the **ipv6** keyword also displays the IPv4 CM in the output if an IPv6 or dual stack CPE is behind the IPv4-only cable modem. In all other cases, only IPv6 data of a CM or CPE is displayed.

The IPv6 output of the **show interface cable modem** command differs from the IPv4 command. The privacy bits and the dual IP flag of the IPv4 command output are not present in the output of the **show interface cable modem** command.

**Table 216**      **Interface Density Information**

| CMTS Router      | Line Card          | Slot   | Subslot | Port   | Cable Interface Index |
|------------------|--------------------|--------|---------|--------|-----------------------|
| Cisco uBR10012   | Cisco uBR-MC3GX60V | 5 to 8 | 0 or 1  | 0 to 4 | 0 to 14               |
|                  | Cisco UBR-MC20X20V |        |         |        | 0 to 4                |
|                  | Cisco uBR10-MC5X20 |        |         |        |                       |
| Cisco uBR7225VXR | All                | 1 or 2 | —       | 0 or 1 | —                     |
| Cisco uBR7246VXR | All                | 3 to 6 | —       | 0 or 1 | —                     |

**Examples**

The following example shows output from the **show interface cable modem** command for all SIDs on a particular cable interface on a Cisco 7200 series router.

Router# **show interface cable 6/0 modem**

| SID | Priv bits | Type  | State      | IP address | method | MAC address    |
|-----|-----------|-------|------------|------------|--------|----------------|
| 1   | 11        | modem | online(pt) | 1.2.3.2    | dhcp   | 0050.7366.1837 |
| 2   | 11        | modem | online(pt) | 1.2.3.3    | dhcp   | 0010.7b6b.71fd |
| 3   | 11        | modem | online(pt) | 1.2.3.4    | dhcp   | 0010.7bb3.fc3d |
| 4   | 00        | modem | init(r1)   | 1.2.3.238  | dhcp   | 0010.7b6b.71a9 |
| 5   | 11        | modem | online(pt) | 1.2.3.5    | dhcp   | 0010.7bed.a731 |
| 6   | 11        | modem | online(pt) | 1.2.3.20   | dhcp   | 0010.7bed.ab4b |
| 7   | 11        | modem | online(pt) | 1.2.3.18   | dhcp   | 0010.7b6b.71e3 |
| 8   | 11        | modem | online(pt) | 1.2.3.13   | dhcp   | 0010.7bed.ab6f |
| 9   | 11        | modem | online(pt) | 1.2.3.21   | dhcp   | 0010.7bed.a52f |
| 10  | 11        | modem | online(pt) | 1.2.3.14   | dhcp   | 0010.7b6b.7191 |
| 11  | 11        | modem | online(pt) | 1.2.3.6    | dhcp   | 0010.7bed.ab57 |

The following example shows output from the **show interface cable modem** command for an individual SID on a particular cable interface on a Cisco 7200 series router.

Router# **show interface cable 6/0 modem 9**

| SID | Priv bits | Type  | State      | IP address | method | MAC address    |
|-----|-----------|-------|------------|------------|--------|----------------|
| 9   | 11        | modem | online(pt) | 1.2.3.21   | dhcp   | 0010.7bed.a52f |

The following example shows output from the **show interface cable modem** command in Cisco IOS release 12.2(33)SCA on a particular cable interface on a Cisco uBR10012 router. None of the CMs or CPEs are supporting both IPv4 and IPv6 addressing, which is indicated by the “N” in the Dual IP output field.

Router# **show interface cable 8/0/0 modem 0**

| SID | Priv bits | Type  | State      | IP address  | method | MAC address    | Dual IP |
|-----|-----------|-------|------------|-------------|--------|----------------|---------|
| 1   | 11        | modem | online(pt) | 10.3.134.12 | dhcp   | 0008.0da6.1c47 | N       |
| 1   | 11        | host  | unknown    | 10.3.134.74 | static | 000b.bf95.f555 | N       |
| 2   | 00        | modem | init(o)    | 10.3.225.26 | dhcp   | 0007.0e07.27d7 | N       |
| 3   | 00        | modem | init(i)    | 10.3.225.19 | dhcp   | 0007.0e06.c769 | N       |
| 4   | 11        | modem | online(pt) | 10.3.134.3  | dhcp   | 0008.0da6.3447 | N       |
| 5   | 11        | modem | online(pt) | 10.3.134.38 | dhcp   | 0011.8065.e78e | N       |
| 6   | 00        | modem | init6(i)   | unavailable |        | 0018.6835.27dd | N       |
| 7   | 11        | modem | online(pt) | 10.3.134.10 | dhcp   | 0011.8065.e7a6 | N       |
| 8   | 00        | modem | init(i)    | 10.3.134.9  | dhcp   | 0006.53b6.57f5 | N       |

## show interface cable modem

```

9 11 modem online(pt) 10.3.134.27 dhcp 0006.53b6.581d N
10 11 modem online(pt) 10.3.134.5 dhcp 0007.0e04.ebfd N

```

The following is a sample output from the **show interface cable modem** command that shows multicast information:

```
Router# show interface cable 6/1/0 modem
```

| SID  | Priv bits | Type      | State      | IP address | method | MAC address    | Dual IP |
|------|-----------|-----------|------------|------------|--------|----------------|---------|
| 9    | 11        | modem     | online(pt) | 101.1.0.6  | dhcp   | 0006.28f9.8c79 | N       |
| 9    | 11        | host      | unknown    | 111.1.1.45 | dhcp   | 0018.1952.a859 | N       |
| 10   | 10        | modem     | online(pt) | 101.1.0.5  | dhcp   | 0006.5305.ac19 | N       |
| 10   | 10        | host      | unknown    | 111.1.0.3  | dhcp   | 0018.1952.a85a | N       |
| 13   | 10        | modem     | online(pt) | 101.1.0.3  | dhcp   | 0014.f8c1.fd1c | N       |
| 8195 | 10        | multicast | unknown    | 224.1.1.51 | static | 0000.0000.0000 | N       |
| 8195 | 10        | multicast | unknown    | 224.1.1.49 | static | 0000.0000.0000 | N       |
| 8195 | 10        | multicast | unknown    | 224.1.1.50 | static | 0000.0000.0000 | N       |

The following is a sample output of the **show interface cable modem** command with the **ipv6** keyword in Cisco IOS Release 12.2(33)SCG:

```
Router# show interface cable 7/0/0 modem ipv6
```

| SID | Type | State   | IPv6 Address                          | M MAC address    |
|-----|------|---------|---------------------------------------|------------------|
| 11  | CM   | online  | 2001:420:3800:809:3519:5F9C:B96A:D31  | D 0025.2e2d.743a |
| 11  | CPE  | unknown | 2001:420:3800:809:3DB2:8A6C:115F:41D8 | D 0011.2544.f33b |

**Table 217** *show interface cable modem Field Descriptions*

| Field     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SID       | Identifies a SID currently defined and in use on this particular cable interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Priv bits | <p>Identifies the current settings of the two privacy bits in the Extended Header (EH) that is used for BPI-encrypted packets.</p> <ul style="list-style-type: none"> <li>First bit—Enable bit. Set to 1 when BPI or BPI+ is enabled.</li> <li>Second bit—Toggle bit. Matches the least significant bit (LSB) of the Key Sequence Number (KSN) in the EH.</li> </ul> <p>For example, a value of “00” indicates that BPI is not enabled. A value of “10” indicates that BPI is enabled and that the KSN is an even number. A value of “11” indicates that BPI is enabled and that the KSN is an odd number.</p> <p><b>Note</b> For more information on these bits, see the DOCSIS Baseline Privacy Interface Plus Interface Specification (SP-BPI+-I08-020301 or later).</p> |
| Type      | <p>Identifies the use for this SID:</p> <ul style="list-style-type: none"> <li>host—SID is used for a CPE device.</li> <li>modem—SID is used for a CM.</li> <li>multicast—SID is used for a multicast broadcast.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



**Table 217** *show interface cable modem Field Descriptions (continued)*

| Field        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| State        | The current state of the MAC layer for this SID and CM (see <a href="#">Table 218</a> for descriptions of the possible states). For hosts or multicast broadcasts, the state will always be unknown.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| IP address   | IP address for the CM using this SID.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| IPv6 Address | IPv6 address of the CM or CPE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| method or m  | Identifies the way that the IP address was assigned: <ul style="list-style-type: none"> <li>• dhcp—The Cisco CMTS first learned of this IP address through a DHCP packet that assigned the address to this device. This IP address is therefore assumed to have been dynamically assigned to the cable modem or CPE device by a DHCP server. (Per the DOCSIS specifications, DHCP is the only valid method for cable modems.)</li> <li>• pppoe—(CPE device only) IP addressing for the CPE device was handled by the Point-to-Point Protocol over Ethernet (PPPoE) protocol.</li> <li>• static—(CPE device only) The Cisco CMTS first learned of this IP address from non-DHCP traffic sent to or from this CPE device. This IP address is therefore assumed to be statically assigned to this particular CPE device.</li> </ul> <p><b>Note</b> The Cisco CMTS could identify a CPE device as having a static IP address, if the Cisco CMTS has been rebooted after the CPE device received its IP address from the DHCP server.</p> |
| MAC address  | Identifies the hardware (MAC) address for the CM using this SID.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Dual IP      | Identifies whether or not (“Y” or “N”) the CM or CPE supports both IPv4 and IPv6 addressing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

[Table 218](#) shows the possible values for the MAC state field:

**Table 218** *Descriptions for the MAC State Field <sup>1</sup>*

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Registration and Provisioning Status Conditions for Devices Using IPv4 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| init(r1)                                                                                 | The CM sent initial ranging.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| init(r2)                                                                                 | The CM is ranging. The CMTS received initial ranging from the CM and has sent RF power, timing offset, and frequency adjustments to the CM.                                                                                                                                                                                                                                                                                                                          |
| init(rc)                                                                                 | Ranging has completed. <p><b>Note</b> If a CM appears to be stuck in this state, it could be that the CM is able to communicate successfully on the cable network, but that the upstream is at capacity and does not have any additional bandwidth to allow the CM to finish registration and come online. Either manually move one or more CMs to other upstreams, or enable load balancing on the upstream using the <b>cable load-balance group</b> commands.</p> |

**Table 218**      **Descriptions for the MAC State Field (continued)<sup>1</sup>**

| MAC State Value                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| init(d)                                                                                  | The DHCP request was received, as DHCPDISCOVER. This also indicates that the first IP broadcast packet has been received from the CM.                                                                                                                                                                                                                                                                                                                                                                           |
| init(dr)                                                                                 | The DHCP request has been sent to the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init(i)                                                                                  | The cable modem has received the DHCPOFFER reply (DHCPACK) from the DHCP server that has assigned an IP address to the modem, but the modem has not yet replied with a DHCPREQUEST message requesting that particular IP address, nor has it sent an IP packet with that IP address.<br><br><b>Note</b> If a CM appears to be stuck in this state, the CM has likely received the DHCPOFFER reply from the DHCP server, but this reply might have contained one or more invalid options for that particular CM. |
| init(io)                                                                                 | The Cisco CMTS has seen the DHCP offer as sent to the cable modem from the DHCP server that has assigned an IP address to the modem.                                                                                                                                                                                                                                                                                                                                                                            |
| init(o)                                                                                  | The CM has begun to download the option file (DOCSIS configuration file) using the Trivial File Transfer Protocol (TFTP), as specified in the DHCP response. If the CM remains in this state, it indicates that the download has failed.                                                                                                                                                                                                                                                                        |
| init(t)                                                                                  | Time-of-day (TOD) exchange has started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| resetting                                                                                | The CM is being reset and will shortly restart the registration process.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Registration and Provisioning Status Conditions for Devices Using IPv6 Addressing</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| init6(s)                                                                                 | The Cisco CMTS router has seen the DHCPv6 SOLICIT message from the CM.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| init6(a)                                                                                 | The Cisco CMTS router has seen the ADVERTISE message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| init6(r)                                                                                 | The Cisco CMTS router has seen the REQUEST response from the CM to the DHCPv6 server.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| init6(i)                                                                                 | The Cisco CMTS router has seen the REPLY message from the DHCPv6 server to the CM.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init6(o)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TFTP server.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| init6(t)                                                                                 | The Cisco CMTS router has seen the REQUEST message from the CM to the TOD server.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Non-error Status Conditions</b>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| cc(r1)                                                                                   | The CM had registered and was online, but has received a Downstream Channel Change (DCC) or Upstream Channel Change (UCC) request message from the CMTS. The CM has begun moving to the new channel, and the CMTS has received the CM's initial ranging on the new downstream or upstream channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                             |
| cc(r2)                                                                                   | This state should normally follow cc(r1) and indicates that the CM has finished its initial ranging on the new channel, and is currently performing continuous ranging on the new channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.                                                                                                                                                     |
| offline                                                                                  | The CM is considered offline (disconnected or powered down).                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 218**      **Descriptions for the MAC State Field (continued)<sup>1</sup>**

| MAC State Value                                                                                                                                                                                                                                                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| online                                                                                                                                                                                                                                                                                                 | The CM has registered and is enabled to pass data on the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| online(d)                                                                                                                                                                                                                                                                                              | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. The CM does not forward traffic to or from the CPE devices, but the CMTS can continue to communicate with the CM using DOCSIS messages and IP traffic (such as SNMP commands).</p> <p><b>Note</b> If BPI was enabled in the DOCSIS configuration file sent to the CM, assume that the CM is using BPI encryption, unless other messages show that the BPI negotiation and key assignments have failed.</p> |
| online(pkd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and KEK is assigned.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pk) states.</p>                                                                                                                                                                                                                                                                   |
| online(ptd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> This state is equivalent to the online(d) and online(pt) states.</p>                                                                                                                                                                                                                            |
| online(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled and KEK is assigned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| online(pt)                                                                                                                                                                                                                                                                                             | <p>The CM registered, BPI is enabled and TEK is assigned. BPI encryption is now being performed.</p> <p><b>Note</b> If network access was disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) instead of online(pt) even when BPI encryption is enabled and operational.</p>                                                                                                                                                                  |
| <p><b>Note</b> If an exclamation point (!) appears in front of one of the online states, it indicates that the <b>cable dynamic-secret</b> command has been used with either the <b>mark</b> or <b>reject</b> option, and that the cable modem has failed the dynamic secret authentication check.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| expire(pk)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                   |
| expire(pkd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, KEK was assigned, but the current KEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pk) states.</p>                                                                                                                                                                                 |
| expire(pt)                                                                                                                                                                                                                                                                                             | The CM registered, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.                                                                                                                                                                                                                                                                                                                                                                                                   |
| expire(ptd)                                                                                                                                                                                                                                                                                            | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled, TEK was assigned, but the current TEK expired before the CM could successfully renew a new KEK value.</p> <p><b>Note</b> This state is equivalent to the online(d) and expire(pt) states.</p>                                                                                                                                                                                 |
| <b>Error Status Conditions</b>                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 218**      **Descriptions for the MAC State Field (continued)<sup>1</sup>**

| MAC State Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| reject(m)       | <p>The CM attempted to register but registration was refused due to a bad Message Integrity Check (MIC) value. This also could indicate that the shared secret in the DOCSIS configuration file does not match the value configured on the CMTS with the <b>cable shared-secret</b> command.</p> <p>In Cisco IOS Release 12.1(11b)EC1 and Cisco IOS Release 12.2(8)BC2 or later releases, this could also indicate that the <b>cable tftp-enforce</b> command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before registering, but the CM did not do so.</p>                                                                                                                                                                                                                   |
| reject(c)       | <p>The CM attempted to register, but registration was refused due to a number of possible errors:</p> <ul style="list-style-type: none"> <li>• The CM attempted to register with a minimum guaranteed upstream bandwidth that would exceed the limits imposed by the <b>cable upstream admission-control</b> command.</li> <li>• The CM has been disabled because of a security violation.</li> <li>• A bad class of service (COS) value in the DOCSIS configuration file.</li> <li>• The CM attempted to create a new COS configuration but the CMTS is configured to not permit such changes.</li> <li>• The CM failed the timestamp check for its DOCSIS configuration file. (This could indicate a possible theft-of-service attempt, or a problem with the synchronization of the clocks on the CM and CMTS.)</li> </ul> |
| reject(pk)      | KEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(pkd)     | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pk) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| reject(pt)      | TEK key assignment is rejected, BPI encryption has not been established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| reject(ptd)     | <p>The CM registered, but network access for CPE devices using this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected.</p> <p><b>Note</b> This state is equivalent to the online(d) and reject(pt) states.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>     | <p>In Cisco IOS Release 12.1(20)EC, Cisco IOS Release 12.2(15)BC1, and earlier releases, when network access is disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows online(d) even if BPI encryption fails. Use the <b>show cable modem mac-address</b> command to confirm whether BPI is enabled or disabled for a particular cable modem.</p>                                                                                                                                                                                                                                                                                                                                                                                            |
| reject(ts)      | <p>The CM attempted to register, but registration failed because the TFTP server timestamp in the CM registration request did not match the timestamp maintained by the CMTS. This might indicate that the CM attempted to register by replaying an old DOCSIS configuration file used during a prior registration attempt.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Table 218**      *Descriptions for the MAC State Field (continued)<sup>1</sup>*

| MAC State Value | Description                                                                                                                                                                                                                                                           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| reject(ip)      | The CM attempted to register, but registration failed because the IP address in the CM request did not match the IP address that the TFTP server recorded when it sent the DOCSIS configuration file to the CM. IP spoofing could be occurring.                       |
| reject(na)      | The CM attempted to register, but registration failed because the CM did not send a Registration-Acknowledgement (REG-ACK) message in reply to the Registration-Response (REG-RSP) message sent by the CMTS. A Registration-NonAcknowledgement (REG-NACK) is assumed. |

1. The CM MAC state field can also be retrieved using SNMP by getting the value of the cdxCmtsCmStatusValue object in the CISCO-DOCS-EXT-MIB.

**Related Commands**

| Command                 | Description                                                   |
|-------------------------|---------------------------------------------------------------|
| <b>show cable modem</b> | Displays information for the registered and unregistered CMs. |

# show interface cable monitor



Note

Effective with Cisco IOS Release 12.2(33)SCA the **show interface cable monitor** command is replaced by the **show interface cable cable-monitor** command.

To display cable monitor information, use the **show interface cable monitor** command in privileged EXEC mode.

**show interface cable {slot/port | slot/subslot/port} monitor**

Syntax Description

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| slot/port         | <p>Displays information for all CMs on the specified cable interface and downstream port on the Cisco uBR7100 series and Cisco uBR7200 series routers, where:</p> <ul style="list-style-type: none"> <li>slot—Specifies the chassis slot number of the cable interface line card.</li> <li>port—Specifies the downstream port number.</li> </ul> <p>Valid values for these arguments are dependent on your CMTS router and cable interface line card. Refer to the hardware documentation for your router chassis and cable interface line card for supported slot and port numbering.</p> |
| slot/subslot/port | <p>Displays information for all CMs on the specified cable interface on a Cisco uBR10012 router, where:</p> <ul style="list-style-type: none"> <li>slot—Specifies the chassis slot number of the cable interface line card. Valid slots are 5 to 8.</li> <li>subslot—Specifies the secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li>port—Specifies the downstream port number. Valid ports are 0 to 4, depending on the cable interface line card.</li> </ul>                                                                                   |

Command Modes

Privileged EXEC (#)

Command History

| Release     | Modification                                                                 |
|-------------|------------------------------------------------------------------------------|
| 12.1(3a)EC  | This command was introduced.                                                 |
| 12.2(4)XF   | Support was added for the Cisco uBR10012 universal broadband router.         |
| 12.2(4)BC1  | Support was added to the Release 12.2 BC train.                              |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                   |
| 12.2(33)SCA | This command is replaced by the <b>show interface cable-monitor</b> command. |

Examples

The following is sample output from the **show interface cable monitor** command:

Router# **show interface cable 5/0 monitor**

| US/ DS | Time Stmp | Outbound Interface | Flow Type | Flow Identifier | Type | Packet Extn. Type | MAC Extn. Type | MAC Type | Encap Type |
|--------|-----------|--------------------|-----------|-----------------|------|-------------------|----------------|----------|------------|
|--------|-----------|--------------------|-----------|-----------------|------|-------------------|----------------|----------|------------|

```

us no Et1/2 us-port 0 yes data no - docsis
all no Et1/2 acc-list 103 yes data no - docsis
all yes Et1/2 mac-addr 0050.0000.0000 yes mac no - -

```

**Table 219** *show interface cable monitor Field Descriptions*

| Field                | Description                                                                                                                                             |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| DS                   | Downstream. Indicates that only downstream flows are monitored.                                                                                         |
| UP                   | Upstream. Indicates that only upstream flows are monitored.                                                                                             |
| ALL                  | Indicates that all flows are monitored.                                                                                                                 |
| Time Stmp            | “Yes” indicates that forwarded packets have been time-stamped, with appended 4 bytes. “No” indicates that forwarded packets have not been time-stamped. |
| Outbound Interface   | Identifies the interfaces where the packets have been forwarded to (Ethernet or Fast Ethernet).                                                         |
| Flow Type            | Identifies the selected flow type, MAC-address, access-list number, or upstream port number.                                                            |
| Flow Type Identifier | MAC address, access-list number, or service ID.                                                                                                         |
| Flow Extn.           | “Yes” indicates that extended filters are configured, and “no” indicates that no extended filters have been configured.                                 |
| MAC Type             | Not applicable.                                                                                                                                         |
| Encap                | DOCSIS encapsulation.                                                                                                                                   |
| Type                 | Forwarded packets with Ethernet encapsulation.                                                                                                          |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command              | Description                                                                                    |
|----------------------|------------------------------------------------------------------------------------------------|
| <b>cable monitor</b> | Enables the forwarding of selected packets on the cable interface to an external LAN analyzer. |

# show interface cable multicast-sessions

To display information about the multicast sessions on a specific cable interface, use the **show interface cable multicast-sessions** command in privileged EXEC mode.

```
show interface cable {slot/port | slot/subslot/port} multicast-sessions
```

Cisco IOS Release 12.2(33)SCE and later releases

```
show interface cable {slot/cable-interface-index | slot/subslot/cable-interface-index}
multicast-sessions [group [ipv4-MQoS-group | ipv6-MQoS-group] | latency | sid [MQoS-sid]]
```

|                    |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | slot                                            | Slot where the line card resides. <ul style="list-style-type: none"><li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li><li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li><li>Cisco uBR10012 router—The valid range is from 5 to 8.</li></ul>                                                                                                                                            |
|                    | subslot                                         | (Cisco uBR10012 only) Secondary slot of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                         |
|                    | port                                            | Downstream port number. <ul style="list-style-type: none"><li>Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li><li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li></ul>                                                                                                                                                       |
|                    | cable-interface-index                           | Downstream port of the Cisco uBR10-MC5X20 or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards.<br><br>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.<br><br>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14. |
|                    | group<br>[ipv4-MQoS-group  <br>ipv6-MQoS-group] | Displays information about the specified IPv4 or IPv6 multicast quality of service (MQoS) group.                                                                                                                                                                                                                                                                                                              |
|                    | latency                                         | Displays information about the multicast session latency.                                                                                                                                                                                                                                                                                                                                                     |
|                    | sid [MQoS-sid]                                  | Displays information about the MQoS service identifier (SID). The value of the SID ranges from 8192 to 12272.                                                                                                                                                                                                                                                                                                 |

|                 |                     |
|-----------------|---------------------|
| Command Default | None                |
| Command Modes   | Privileged EXEC (#) |



## Command History

| Release     | Modification                                                                                                                                                                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was introduced.                                                                                                                                                                                                                                     |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the downstream port of the Cisco uBR10-MC5X20 or the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |
| 12.2(33)SCF | This command was modified. The <b>latency</b> keyword was added.                                                                                                                                                                                                 |

## Examples

The following example is a sample output from the **show interface cable multicast-sessions** command:

```
Router# show interface cable 7/0/0 multicast-sessions
```

```
Default Multicast Service Flow 3 on Cable7/0/0
```

```
Multicast Sessions on Cable7/0/0
```

| Group      | Interface | GC | SAID | SFID | GQC | GEn | RefCount | GC-Interface | State  |
|------------|-----------|----|------|------|-----|-----|----------|--------------|--------|
| 224.1.1.45 | Bundle1.1 | 1  | 8193 | 24   | 1   | 5   | 1        | Bundle1      | ACTIVE |
| 224.1.1.46 | Bundle1.1 | 1  | 8193 | 24   | 1   | 5   | 1        | Bundle1      | ACTIVE |
| 224.1.1.47 | Bundle1.1 | 1  | 8193 | 24   | 1   | 5   | 1        | Bundle1      | ACTIVE |

```
Aggregate Multicast Sessions on Cable7/0/0
```

```
Aggregate Sessions for SAID 8193 SFID 24 GQC 1 CurrSess 3
```

| Group      | Interface | GC | SAID | SFID | AggGQC | GEn | RefCount | GC-Interface |
|------------|-----------|----|------|------|--------|-----|----------|--------------|
| 224.1.1.45 | Bundle1.1 | 1  | 8193 | 24   | 1      | 5   | 1        | Bundle1      |
| 224.1.1.46 | Bundle1.1 | 1  | 8193 | 24   | 1      | 5   | 1        | Bundle1      |
| 224.1.1.47 | Bundle1.1 | 1  | 8193 | 24   | 1      | 5   | 1        | Bundle1      |

The following example is a sample output from the **show interface cable multicast-sessions latency** command:

```
Router# show interface cable 5/0/0 multicast-sessions latency
```

```
Session (S,G) : (*,230.1.2.4)
```

```
Fwd Intfc : Ca5/0/0
```

```
MQoS Entered at MQoS Exit at
```

```
Mar 6 23:13:14.387 Mar 6 23:13:14.387
```

```
GC SAID SFID SF req SF rsp
```

```
1 8197 17 Mar 6 23:13:14.387 Mar 6 23:13:14.391
```

The following example is a sample output from the **show interface cable multicast-sessions group** command:

```
Router# show interface cable 5/0/0 multicast-sessions group 230.1.2.4
```

```
Multicast Group : 230.1.2.4
```

```
Source : N/A
```

```
Act GCRs : 1
```

```
Interface : Bu1
```

```
State: A
```

```
GI: Bu1
```

```
RC: 0
```

| GCR | GC   | SAID | SFID | Key | GQC | GEn |
|-----|------|------|------|-----|-----|-----|
| 1   | 8197 | 17   | 0    | 1   | 0   |     |

show interface cable multicast-sessions

The following example is a sample output from the **show interface cable multicast-sessions sid** command:

```
Router# show interface cable 5/0/0 multicast-sessions sid 8197

Multicast Group : 230.1.1.2.4
Source : N/A
Act GCRs : 1
Interface : Bu1 State: A GI: Bu1 RC: 0

GCR : GC SAID SFID Key GQC GEn
 1 8197 17 0 1 0
```

Related Commands

| Command                                          | Description                                                                                                                                 |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| show interface cable                             | Displays configuration and status information for the cable interface.                                                                      |
| show interface cable modem                       | Displays information about cable modems and associated customer premises equipment (CPE) devices connected to a particular cable interface. |
| show interface bundle multicast-sessions         | Displays information about the multicast sessions on a specific virtual cable bundle.                                                       |
| show interface modular-cable multicast-sessions  | Displays information about multicast sessions on a specific modular-cable interface.                                                        |
| show interface wideband-cable multicast-sessions | Displays information about the multicast sessions on a specific wideband-cable interface.                                                   |

# show interface cable packetcable statistics

To display PacketCable interprocess communication (IPC) statistics based on the cable interface, use the **show interface cable packetcable statistics** command in privileged EXEC mode.

**show interface cable** { *slot/cable-interface-index* | *slot/subslot/cable-interface-index* } **packetcable statistics**

|                           |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>slot</i>                                                                                                                              | Slot where the line card resides. <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li><li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li><li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li></ul>                                                                                                                                                                                                                   |
|                           | <i>cable-interface-index</i>                                                                                                             | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"><li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li><li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li></ul> |
|                           | <i>subslot</i>                                                                                                                           | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                               |
|                           |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Command Default</b>    | None                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Command Modes</b>      | Privileged EXEC (#)                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Command History</b>    | <b>Release</b>                                                                                                                           | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                           | Cisco IOS Release 12.2(33)SCF                                                                                                            | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Usage Guidelines</b>   | The <b>show interface cable packetcable statistics</b> command provides IPC statistics for the PacketCable module for debugging purpose. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## Examples

The following is a sample output of the **show interface cable packetcable statistics** command that shows PacketCable IPC statistics based on the cable interface specified on the Cisco uBR10012 router in Cisco IOS Release 12.2(33)SCF:

```
Router# show interface cable 7/1/0 packetcable statistics
```

Packetcable IPC Statistics on RP

|      |        |      |      |          |        |
|------|--------|------|------|----------|--------|
| Msg  | create | gate | gate | gate set | dsd    |
|      | gie    | set  | del  | notify   | notify |
| Sent | 0      | 10   | 0    | 0        | 0      |
| Rcvd | 0      | 0    | 0    | 10       | 0      |

Packetcable IPC Statistics on LC

|      |        |      |      |          |        |
|------|--------|------|------|----------|--------|
| Msg  | create | gate | gate | gate set | dsd    |
|      | gie    | set  | del  | notify   | notify |
| Sent | 0      | 0    | 0    | 10       | 0      |
| Rcvd | 0      | 10   | 0    | 0        | 0      |

[Table 213](#) describes the significant fields shown in the **show interface cable packetcable statistics** command display.

**Table 220** *show interface cable packetcable statistics Field Descriptions*

| Field           | Description                          |
|-----------------|--------------------------------------|
| Msg             | IPC messages sent and received.      |
| create gie      | Gate create request.                 |
| gate set        | Gate set request.                    |
| gate del        | Gate delete request.                 |
| gate set notify | Gate set notification.               |
| dsd notify      | Dynamic service delete notification. |

## Related Commands

| Command                                            | Description                                                                 |
|----------------------------------------------------|-----------------------------------------------------------------------------|
| <b>show interface cable dynamic-qos statistics</b> | Displays dynamic service statistics based on the specified cable interface. |

# show interface cable privacy

To display the baseline privacy information, use the **show interface cable privacy** command in privileged EXEC mode.

**show interface cable** { *slot/port* | *slot/subslot/port* } **privacy** { **all** | **eae-policy** | **tek** | **kek** | **hotlist** }

**Cisco IOS Release 12.2(33)SCE and later**

**show interface cable** { *slot/cable-interface-index* | *slot/subslot/cable-interface-index* } **privacy** { **all** | **eae-policy** | **tek** | **kek** }

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <b>all</b>                   | Displays all privacy configuration details.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>eae-policy</b>            | Displays early authentication and encryption (EAE) configuration details.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>tek</b>                   | Displays the traffic encryption key (tek) values.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>kek</b>                   | Displays the key encryption key (kek) values.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>hotlist</b>               | Displays a list of cable modems detected as clones.                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Command Modes** Privileged EXEC (#)

## ■ show interface cable privacy

### Command History

| Release     | Modification                                                                                                                                                                                                                                                                                                                 |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced.                                                                                                                                                                                                                                                                                                 |
| 12.2(33)SCD | A new keyword, <b>hotlist</b> , was added to display the cable modems detected as clones.                                                                                                                                                                                                                                    |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. The <b>hotlist</b> keyword was removed from this command and added to the <b>show cable privacy</b> command. |

### Usage Guidelines

The **show interface cable privacy** command is available only in IOS images that support Baseline Privacy Interface (BPI) and BPI+ encryption.

### Examples

The following is a sample output of the **show interface cable privacy** command with the **tek** keyword:

```
Router# show interface cable 3/0 privacy tek
```

```
Configured TEK life-time value = 56000
```

The following is a sample output of the **show interface cable privacy** command with the **kek** keyword:

```
Router# show interface cable 3/0 privacy kek
```

```
Configured KEK life-time value = 750000
```

The following is a sample output of the **show interface cable privacy** command with the **hotlist** keyword:

```
Router# show interface cable 5/1/0 privacy hotlist
```

| MAC Address    | Last Ranged On  | Type      |
|----------------|-----------------|-----------|
| 00a0.73b0.4c43 | Oct 27 21:57:39 | Permanent |
| 001a.c3ff.d2d4 | Oct 27 21:57:40 | Permanent |
| 0018.6852.7746 | Never           | Permanent |
| 000e.9bb3.b946 | Never           | Permanent |

The following is a sample output of the **show interface cable privacy** command with the **eae-policy** keyword:

```
Router# show interface cable 5/1/0 privacy eae-policy
```

```
EAE Configuration
Policy: EAE Ranging Enforcement
```

The following is a sample output of the **show interface cable privacy** command with the **all** keyword:

```
Router# show interface cable 5/1/0 privacy all
```

```
EAE Configuration
Policy: EAE Ranging Enforcement
```

```

KEK Configuration
 KEK lifetime: 604800
 Auth Infos: 0
 Auth Requests: 0, Auth Replies: 0
 Auth Rejects: 0, Auth Invalids: 0

Packet Buffer Failures: 0
Unrecoverable SPA Key Failures: 0

TEK Configuration
 TEK lifetime: 43200
 TEK Requests: 0, TEK Replies: 0
 TEK Rejects: 0, TEK Invalids: 0
 SAMap Requests: 0, SAMap Replies: 0
 SAMap Rejects: 0

Interface Configuration
 SelfSigned Trust: Untrusted
 Check Cert Validity Periods: True

```

Table 221 describes the significant fields shown in the **show interface cable privacy** command display:

**Table 221** *show interface cable privacy Command Field Description*

| Field                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configured TEK life-time value = | Number of seconds defining the length of the traffic encryption key lifetime. The valid range is from 1,800 to 6,048,000 seconds. The default value is 43,200 seconds (12 hours).                                                                                                                                                                                                                                                                                                                                                                                     |
| Configured KEK life-time value = | Number of seconds defining the length of the key encryption key lifetime. The valid range is from 86,400 to 6,048,000 seconds. The default value is 604,800 seconds (7 days).                                                                                                                                                                                                                                                                                                                                                                                         |
| MAC Address                      | MAC address of the cloned cable modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Last Ranged On                   | Displays the time stamp when the cable modem last attempted registration on that interface. This value helps gauge the frequency with which the MAC address is attempting to be cloned, and manage the hotlist accordingly.                                                                                                                                                                                                                                                                                                                                           |
| Type                             | <ul style="list-style-type: none"> <li>Permanent—The cable modem entry can be configured as a permanent clone from the CLI by executing the <b>cable privacy hotlist cable modem</b> command. A cable modem marked as a permanent clone can only be removed from the hotlist by executing the <b>no</b> form of the <b>cable privacy hotlist cable modem</b> command.</li> <li>Temporary—The Cisco CMTS detects a duplicate cable modem MAC address. This duplicate MAC address is flagged as a clone and is prevented from coming online for 180 seconds.</li> </ul> |

 show interface cable privacy**Related Commands**

| Command                          | Description                                                                                                                                     |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable privacy</b>             | Enables the operation of BPI/BPI+ encryption on the Cisco CMTS router.                                                                          |
| <b>cable privacy eae-exclude</b> | Forces a cable modem to register without an early authentication and encryption (EAE) policy.                                                   |
| <b>cable privacy eae-policy</b>  | Enables an early authentication and encryption policy for a cable modem registraion.                                                            |
| <b>cable privacy hotlist</b>     | Marks a CA certificate or cable modem certificate of a manufacturer as untrusted and adds it to the Cisco CMTS hotlist of invalid certificates. |
| <b>cable privacy kek</b>         | Sets the KEK lifetime values for baseline privacy.                                                                                              |
| <b>cable privacy tek</b>         | Sets the TEK lifetime values for baseline privacy.                                                                                              |
| <b>show cable privacy</b>        | Displays the BPI certificate information.                                                                                                       |



# show interface cable qos paramset

To display the attributes of the service flow quality of service (QoS) parameter set, use the **show interface cable qos paramset** command in privileged EXEC mode.

```
show interface cable {slot/port | slot/subslot/port} qos paramset [paramset-index] [verbose]
```

**Cisco IOS Release 12.2(33)SCE and later releases**

```
show interface cable {slot/cable-interface-index | slot/subslot/cable-interface-index} qos
paramset [paramset-index | total] [verbose]
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                       |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                   |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |
| <i>paramset-index</i>        | (Optional) Service template index (1 to 255).                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>total</b>                 | (Optional) Displays the total number of service flows per service template.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>verbose</b>               | (Optional) Displays full details about the QoS parameter set.                                                                                                                                                                                                                                                                                                                                                                                |

**Command Modes** Privileged EXEC (#)

## show interface cable qos paramset

### Command History

| Release     | Modification                                                                                                                                                                                                    |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX   | This command replaces the <b>show cable qos profile</b> command for DOCSIS 1.1 operation.                                                                                                                       |
| 12.2(4)BC1  | Support was added to the Release 12.2 BC train.                                                                                                                                                                 |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |
| 12.2(33)SCF | This command was modified. The <b>total</b> keyword was added to display the total number of service flows per service template.                                                                                |
| 12.2(33)SCG | The command output was modified to display the scheduling type as “N/A” for all downstream service flows.                                                                                                       |

### Usage Guidelines

The **show interface cable qos paramset** command displays the QoS parameter set for all the service flows on a particular cable interface.



#### Note

Parameter sets that contain a service-class name string are not in an “expanded” state and serve as provisioning envelopes of class-based service flows. The actual attributes of such parameter sets depend on the service class that is referenced at the time the parameter sets are expanded.



#### Note

Starting with Cisco IOS Release 12.2(33)SCG, the output of the **show interface cable qos paramset** command displays the scheduling type of all downstream service flows (DS-SF) as “N/A” to indicate that the DS-SFs do not have any scheduling type.

### Examples

#### Example of the show interface cable qos paramset Command Output

The following is a sample output of the **show interface cable qos paramset** command:

```
Router# show interface c6/0 qos paramset
```

| Index | Name | Dir | Sched | Prio | MaxSusRate | MaxBurst | MinRsvRate |
|-------|------|-----|-------|------|------------|----------|------------|
| 1     |      | US  | BE    | 0    | 64000      | 0        | 0          |
| 2     |      | DS  | BE    | 0    | 1000000    | 0        | 0          |
| 3     |      | US  | BE    | 7    | 1000000    | 1522     | 0          |
| 4     |      | DS  | BE    | 0    | 10000000   | 3044     | 0          |
| 128   |      | US  | BE    | 7    | 1000000    | 1522     | 0          |
| 129   |      | DS  | BE    | 0    | 10000000   | 3044     | 0          |



#### Note

In Cisco IOS Release 12.2(11)BC3 and later releases, the Cisco CMTS automatically maps the non-default DOCSIS 1.0 QoS profiles to profile numbers starting at 128, to facilitate their use in DOCSIS 1.1 networks.

#### Example of the show interface cable qos paramset verbose Command Output

The following is a sample output for the **verbose** form of the **show interface cable qos paramset** command:

```
Router# show interface c6/0 qos paramset 1 verbose
```

```

Index: 1
Name:
Direction: Upstream
Traffic Priority: 0
Maximum Sustained Rate: 64000 bits/sec
Max Burst: 0 bytes
Minimum Reserved Rate: 0 bits/sec
Minimum Packet Size 0 bytes
Maximum Concatenated Burst: 1522
Scheduling Type: Best Effort
Request/Transmission Policy: 0x0
Nominal Polling Interval: 0
Tolerated Poll Jitter: 0
Unsolicited Grant Size: 0 bytes
Nominal Grant Interval: 0 usecs
Tolerated Grant Jitter: 0 usecs
Grants per Interval: 0
IP ToS Overwrite [AND-mask,OR-mask]: 0x0,0x0

```

### Example of the show interface cable qos paramset total Command in Cisco IOS Release 12.2(33)SCF

The following is a sample output for the **total** option of the **show interface cable qos paramset** command:

Router# **show interfaces cable 6/1/0 qos paramset total**

| Index | SrvClassName    | Dir | Sched | MaxSusRate | MaxBurst | MinRsvRate | Total |
|-------|-----------------|-----|-------|------------|----------|------------|-------|
| 1     |                 | US  | BE    | 64000      | 0        | 0          | 50669 |
| 2     |                 | DS  | BE    | 1000000    | 0        | 0          | 50669 |
| 3     | def_sclass      | DS  | BE    | 10000000   | 3044     | 0          | 6     |
| 4     | us_srvclass_ts1 | US  | BE    | 0          | 3044     | 0          | 4     |
| 5     | us_srvclass_ts1 | US  | BE    | 0          | 3044     | 0          | 8     |
| 6     | us_srvclass_ts2 | US  | BE    | 0          | 3044     | 0          | 4     |
| 7     | us_srvclass_ts2 | US  | BE    | 0          | 3044     | 0          | 8     |
| 8     | ds_srvclass_ts1 | DS  | BE    | 0          | 3044     | 0          | 12    |
| 9     | ds_srvclass_ts2 | DS  | BE    | 0          | 3044     | 0          | 12    |



#### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

Table 222 describes the significant fields shown in the display.

**Table 222** *show interface cable qos paramset Field Descriptions*

| Field        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dir          | Downstream (DS) or upstream (US) service flow.                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Sched        | Identifies scheduling type of the service flow: <ul style="list-style-type: none"> <li>• BE—Best-Effort</li> <li>• N/A—Scheduling type is not applicable to a service flow.</li> <li>• NRTPS—Non-Real-Time Polling Service</li> <li>• RTPS—Real-Time Polling Service</li> <li>• RSVD—Reserved but not yet in use</li> <li>• UGS_AD—Unsolicited Grant Service with Activity Detection</li> <li>• UGS—Unsolicited Grant Service</li> <li>• UNDEF—Not yet defined.</li> </ul> |
| Prio         | Traffic priority (0 to 7) given to this service flow.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| MaxSusRate   | Maximum sustained rate value, in bits per second.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| MaxBrst      | Maximum burst value, in bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| MinRsvRate   | Minimum reserved rate, in bits per second.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SrvClassName | Service class name associated with the service flow.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Total        | Total number of service flows per service template.                                                                                                                                                                                                                                                                                                                                                                                                                        |

**Related Commands**

|                                  |                                                                                     |
|----------------------------------|-------------------------------------------------------------------------------------|
| <b>show cable qos permission</b> | Displays the status of permissions for changing QoS tables.                         |
| <b>show cable modem qos</b>      | Displays quality of service (QoS) and service flow information for a particular CM. |
| <b>show cable qos profile</b>    | Displays the QoS profiles that have been defined.                                   |

# show interface cable service-flow

To display the attributes of DOCSIS service flows on a cable interface, use the **show interface cable service-flow** command in privileged EXEC mode.

```
show interface cable {slot/port | slot/subslot/port} service-flow [sfid [queue | classifiers | counters
| phs | qos [ds | us]]] [verbose]]
```

**Cisco IOS Release 12.2(33)SCE and later releases**

```
show interface cable {slot/cable-interface-index | slot/subslot/cable-interface-index} service-flow
[sfid [queue | classifiers | counters | phs | qos [ds | service-class | us]]] [verbose]]
```

| Syntax Description                 |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                        | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                 |
| <i>subslot</i>                     | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| <i>port</i>                        | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                               |
| <i>cable-interface-index</i>       | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco UBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |
| <i>sfid</i>                        | (Optional) Identifies the service flow index (1 to 65535).                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>queue</b>                       | (Optional, Cisco 7100 and 7200 series routers only) Displays the downstream hierarchical queueing framework (HQF) queue information associated with this interface. To display detailed information of all the queues under this service flow, use the <b>verbose</b> option with this queue.                                                                                                                                                |
| <b>classifiers</b> [ <i>clid</i> ] | (Optional) Displays all classifiers associated with this service flow or optionally display information only for the specified classifier ID ( <i>clid</i> , 1 to 65535).                                                                                                                                                                                                                                                                    |
| <b>counters</b>                    | (Optional) Displays the real-time counters for the service flow for a specific SFID, to include the number of matches when used with the <b>verbose</b> keyword. <p>This counter remains initialized for upstream service flows. The match count for upstream classifiers is not supported and is replaced with null value - in such cases.</p>                                                                                              |

|                      |                                                                                                                                                                                                                                                                 |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>phs</b>           | (Optional) Displays packet header suppression rules and packet counters for the service flow for a specific SFID.<br><br>The PHS packet counters are not supported on the Cisco uBR10-MC5X20 card and always shows 0 or N/A, depending on the software release. |
| <b>qos</b>           | (Optional) Displays QoS information for the service flow for a specific SFID.                                                                                                                                                                                   |
| <b>ds</b>            | (Optional) Displays QoS information for all the downstream service flows on the interface.                                                                                                                                                                      |
| <b>service-class</b> | (Optional) Displays service class names, along with other QoS information, for all the service flows on the interface.                                                                                                                                          |
| <b>us</b>            | (Optional) Displays QoS information for all the upstream service flows on the interface.                                                                                                                                                                        |
| <b>verbose</b>       | (Optional) Displays detailed information on the service flow for a specific SFID.                                                                                                                                                                               |

**Command Modes**

Privileged EXEC (#)

**Command History**

| <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                               |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(4)CX      | This command was introduced.                                                                                                                                                                                                      |
| 12.2(4)BC1     | The command was changed so that the optional keywords are supported only when displaying information for a specific service flow index.                                                                                           |
| 12.2(8)BC1     | The command was changed to remove the ability to display all service flows, and a service flow index must now be specified.                                                                                                       |
| 12.3BC         | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                        |
| 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                                |
| 12.2(33)SCB    | This command was modified to display either the downstream (DS) channel ID or the bonding group (BG) ID of the forwarding interface assigned to the downstream service flow.                                                      |
| 12.2(33)SCC    | This command was modified to display bonded service flow information.                                                                                                                                                             |
| 12.2(33)SCD    | This command was modified. The <b>queue</b> keyword was added to display downstream HQF queue information for the interface.                                                                                                      |
| 12.2(33)SCE    | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco UBR-MC20X20V, Cisco uBR-MC5X20 and Cisco uBR-MC3GX60V cable interface line cards. |
| 12.2(33)SCF    | This command was modified. The <b>service-class</b> keyword was added to display service class names for all the service flows on an interface.                                                                                   |
| 12.2(33)SCG    | The command output was modified to display the scheduling type as “N/A” for all downstream service flows.                                                                                                                         |

**Usage Guidelines**

In Cisco IOS Release 12.2(4)BC1 and later, the optional keywords **classifiers**, **counters**, **pbs**, **qos**, and **verbose** can be used only when requesting information for a specific service flow ID. When a service flow ID is specified, the **verbose** keyword can be used by itself or by any of the other optional keywords.

**Note**

When using the **counters** keyword with the **verbose** keyword, this command displays the number of matches for the classifier match counter. However, this counter remains initialized for upstream service flows when using the **verbose** keyword. The match count for upstream classifiers is not supported and is replaced with null value - in such cases.

**Note**

Starting with Cisco IOS Release 12.2(33)SCG, the output of the **show interface cable service-flow qos** command displays the scheduling type of all downstream service flows (DS-SF) as "N/A" to indicate that the DS-SFs do not have any scheduling type.

The following two **show** command examples illustrate counter information, with null value for the number of matches for the upstream service flow, when the **show interface cable service-flow** command is used with **verbose** keyword:

```
Router# show interface cable 6/0 service-flow 30191 verbose
```

```
Sfid : 30191
Mac Address : 000a.739e.140a
Type : Secondary(Dynamic)
Direction : Upstream
Current State : Active
Current QoS Indexes [Prov, Adm, Act] : [0, 24, 24]
Active Time : 00:55
Sid : 7140
Admitted QoS Timeout : 200 seconds
Active QoS Timeout : 0 seconds
Packets : 1824
Bytes : 466944
Rate Limit Delayed Grants : 0
Rate Limit Dropped Grants : 0
Current Throughput : 68356 bits/sec, 32 packets/sec
Classifiers:
Classifier Id : 41
Service Flow Id : 30191
CM Mac Address : 000a.739e.140a
Direction : upstream
Activation State : active
Classifier Matching Priority : 128
PHSI : 1
Number of matches : -
```

```
IP Classification Parameters:
IP Source Address : 10.8.230.3
Source IP Address Mask : 255.255.255.255
Destination IP Address : 172.16.2.35
Destination IP Address Mask : 255.255.255.255
IP Protocol Type : 17
Source Port Low : 53456
Source Port High : 53456
Destination Port Low : 7052
Destination Port High : 7052
```

```
Router# show interface c6/0 service-flow 30191 pbs verbose
```

## show interface cable service-flow

```
Sfid : 30191
PHSI : 1
PHSS : 42
PHSV : Off
PHSM : FF FF FF FF FF C0
PHSF : 00 03 E3 31 65 A8 00 0A 73 9E 14 0C 08 00 45 A0 01 18 BE EF
 00 00 40 11 1C 07 0A 08 E6 03 AC 10 02 23 D0 D0 1B 8C 01 04
 00 00
Packet : 1844
```

### Examples

The following examples show a sample output of the **show interface cable service-flow** command.

```
Router# show interface c3/0 service-flow
```

| Sfid | Sid | Mac Address    | QoS Prov | Param Adm | Index Act | Type | Dir | Curr State | Active Time | BG / CH |
|------|-----|----------------|----------|-----------|-----------|------|-----|------------|-------------|---------|
| 12   | N/A | 0014.0496.3f9e | 4        | 4         | 4         | prim | DS  | act        | 3h17m       | CH 1    |
| 11   | 5   | 0014.0496.3f9e | 3        | 3         | 3         | prim | US  | act        | 3h17m       |         |
| 14   | N/A | 0014.0496.3f76 | 4        | 4         | 4         | prim | DS  | act        | 3h17m       | BG 102  |
| 13   | 6   | 0014.0496.3f76 | 3        | 3         | 3         | prim | US  | act        | 3h17m       |         |
| 16   | N/A | 0007.0e07.24af | 4        | 4         | 4         | prim | DS  | act        | 3h17m       | CH 1    |
| 15   | 7   | 0007.0e07.24af | 3        | 3         | 3         | prim | US  | act        | 3h17m       |         |
| 18   | N/A | 0007.0e06.e1b5 | 4        | 4         | 4         | prim | DS  | act        | 3h17m       | CH 3    |
| 17   | 8   | 0007.0e06.e1b5 | 3        | 3         | 3         | prim | US  | act        | 3h17m       |         |

Per normal operation, the counter in the Number of Matches field is not initialized for working dynamic service flows. For upstream service flows, the classifier match count is not updated for upstream packet classifiers, and displays no results.

```
Router# show interface c6/0 service-flow 30191 verbose
```

```
Sfid : 30191
Mac Address : 000a.739e.140a
Type : Secondary(Dynamic)
Direction : Upstream
Current State : Active
Current QoS Indexes [Prov, Adm, Act] : [0, 24, 24]
Active Time : 00:55
Sid : 7140
Admitted QoS Timeout : 200 seconds
Active QoS Timeout : 0 seconds
Packets : 1824
Bytes : 466944
Rate Limit Delayed Grants : 0
Rate Limit Dropped Grants : 0
Current Throughput : 68356 bits/sec, 32 packets/sec
Classifiers:
Classifier Id : 41
Service Flow Id : 30191
CM Mac Address : 000a.739e.140a
Direction : upstream
Activation State : active
Classifier Matching Priority : 128
PHSI : 1
Number of matches : -
IP Classification Parameters:
IP Source Address : 10.8.230.3
Source IP Address Mask : 255.255.255.255
Destination IP Address : 172.16.2.35
Destination IP Address Mask : 255.255.255.255
IP Protocol Type : 17
Source Port Low : 53456
Source Port High : 53456
```



Destination Port Low : 7052  
Destination Port High : 7052

**Note**

Per the DOCSIS 1.1 specification, the **show interface cable service-flow** command uses bytes allocated for a UGS service flow when calculating the throughput values for the service flow (see the Assumed Minimum Reserved Rate Packet Size parameter, TLV 11 in the upstream and downstream service flow configurations). Depending on the value of this parameter and the packet sizes of the actual traffic, this could result in throughput values that appear to be greater than the maximum sustained rate. You can use the **stats** option with the **show interface cable** command to display the actual byte counts.

**Sample Downstream Flow**

Router# **show interface c4/0 service-flow 12 qos verbose**

```
Sfid : 12
Current State : Active
Sid : N/A
Traffic Priority : 0
Maximum Sustained rate : 1000000 bits/sec
Maximum Burst : 0 bytes
Minimum Reserved rate : 0 bits/sec
Minimum Packet Size : 0 bytes
Maximum Latency : 0 usecs
Current Throughput : 0 bits/sec, 0 packets/sec
```

**Sample Upstream Flow**

Router# **show interface c4/0 service-flow 11 qos verbose**

```
Sfid : 11
Current State : Active
Sid : 5
Traffic Priority : 0
Maximum Sustained rate : 64000 bits/sec
Maximum Burst : 0 bytes
Minimum Reserved rate : 0 bits/sec
Minimum Packet Size : 0 bytes
Maximum Concatenated Burst : 1522
Scheduling Type : Best Effort
Unsolicited Grant Size : 0 bytes
Nominal Grant Interval : 20000 usecs
Grants per interval : 0
Tolerated Grant Jitter : 0 usecs
Nominal Polling Interval : 0 usecs
Tolerated Polling Jitter : 0 usecs
Request/Transmission policy : 0x0
IP ToS Overwrite[AND-mask, OR-mask] : 0x0, 0x0
Current Throughput : 0 bits/sec, 0 packets/sec
```

**Tip**

When PacketCable services are enabled to allow PacketCable-based Voice over IP (VoIP) traffic, the Nominal Grant Interval reflects the packetization interval that is configured on the VoIP call agent.

Router# **show interface c4/0 service-flow counters**

| Sfid | Packets | Bytes | PacketDrops | Bits/Sec | Packets/Sec |
|------|---------|-------|-------------|----------|-------------|
| 12   | 0       | 0     | 0           | 0        | 0           |
| 11   | 8       | 128   | 0           | 0        | 0           |
| 14   | 0       | 0     | 0           | 0        | 0           |
| 13   | 2       | 128   | 0           | 0        | 0           |
| 16   | 0       | 0     | 0           | 0        | 0           |
| 15   | 2       | 128   | 0           | 0        | 0           |
| 18   | 5       | 128   | 0           | 0        | 0           |

## ■ show interface cable service-flow

```
17 2 128 0 0 0
```

Router# **show interface c4/0 service-flow 12 counters verbose**

```
Sfid : 12
Packets : 154
Octets : 51656
RateLimit Delayed Pkts : 0
RateLimit Dropped Pkts : 0
Bits/sec : 0
Packets/Sec : 0
```

Router# **show interface c4/0 service-flow 14 classifiers**

| CfrId | SFID | cable modem Mac Address | Direction | State    | Priority | Matches |
|-------|------|-------------------------|-----------|----------|----------|---------|
| 2     | 14   | 00d0.bad3.c46b          | upstream  | active   | 8        | 0       |
| 1     | 14   | 00d0.bad3.c46b          | upstream  | inactive | 5        | 0       |

Router# **show interface c4/0 service-flow 14 classifiers verbose**

```
Sfid : 14

Classifier Id : 2
Service Flow Id : 14
cable modem Mac Address : 00d0.bad3.c46b
Direction : upstream
Activation State : active
Classifier Matching Priority : 8
PHSI : 0
Number of matches : 0
IP Classification Parameters:
 Destination Port Low : 1024
 Destination Port High : 65535
```

Router# **show interface cable 3/0 service-flow 9 phs**

| Sfid | PHSI | PHSS | PHSM     | PHSF                    | PHSV | Packet |
|------|------|------|----------|-------------------------|------|--------|
| 20   | 1    | 22   | 00 00 FF | 08 00 45 00 00 56 00 00 | On   | N/A    |

Router# **show interface cable 3/0 service-flow 9 phs verbose**

```
Sfid : 20
PHSI : 1
PHSS : 22
PHSV : On
PHSM : 00 00 FF
PHSF : 08 00 45 00 00 56 00 00 00 00 3C 00 67 A7 0B 00 00 01 0C 00
 00 01
Packet : N/A
```

Router# **show interface c6/0 service-flow 30191 phs verbose**

```
Sfid : 30191
PHSI : 1
PHSS : 42
PHSV : Off
PHSM : FF FF FF FF FF C0
PHSF : 00 03 E3 31 65 A8 00 0A 73 9E 14 0C 08 00 45 A0 01 18 BE EF
 00 00 40 11 1C 07 0A 08 E6 03 AC 10 02 23 D0 D0 1B 8C 01 04
 00 00
Packet : 1844
```

**Example of the show interface cable service-flow Command Output in Cisco IOS Release 12.2(33)SCD**

The following example shows sample output for the **show interface cable service-flow** command.

Router# **show interface c3/0 service-flow**

| Sfid | Sid | Mac Address    | QoS Prov | Param Adm | Index Act | Type | Dir | Curr State | Active Time | DS-ForwIf/US-BG/CH |
|------|-----|----------------|----------|-----------|-----------|------|-----|------------|-------------|--------------------|
| 17   | 4   | 001c.ea37.9aac | 3        | 3         | 3         | P    | US  | act        | 13h21m      | CH 3               |
| 18   | N/A | 001c.ea37.9aac | 4        | 4         | 4         | P    | DS  | act        | 13h21m      | Wi3/0:0            |
| 21   | 6   | 001c.ea37.9b5a | 3        | 3         | 3         | P    | US  | act        | 13h21m      | CH 4               |
| 22   | N/A | 001c.ea37.9b5a | 4        | 4         | 4         | P    | DS  | act        | 13h21m      | Wi3/0:0            |
| 23   | 7   | 0016.925e.654c | 3        | 3         | 3         | P    | US  | act        | 13h21m      | CH 3               |
| 24   | N/A | 0016.925e.654c | 4        | 4         | 4         | P    | DS  | act        | 13h21m      | In3/0:0            |

**Example of the show interface cable service-flow queue Command Output That Shows Downstream HQF Queue Information in Cisco IOS Release 12.2(33)SCD**

The following example shows a sample output of the **show interface cable service-flow queue** command displaying downstream HQF queue information for an interface:

Router# **show interface cable 3/0 service-flow 8 queue**

| * | idx/gqid | Len/Limit<br>pkts | Degs<br>pkts | Drops<br>pkts | CIR<br>kbps | MIR/PR<br>kbps |
|---|----------|-------------------|--------------|---------------|-------------|----------------|
|   | 0/53     | 0/128             | 0            | 0             | 100         | 15000/0        |

I: Cable Interface Queue

\$: Low Latency Queue

~: Low Latency Policing Queue

**Example of the show interface cable service flow queue verbose Command Output That Shows Detailed Downstream HQF Queue Information in Cisco IOS Release 12.2(33)SCD**

The following example shows a sample output of the **show interface cable service-flow queue verbose** command displaying detailed downstream HQF queue information for an interface:

Router# **show interfaces c3/0 service-flow 8 queue verbose**

```

blt (0x19FA93C0, index 6, qid 53, fast_if_number 20) layer CLASS_HIERO
scheduling policy: FIFO (110)
classification policy: NONE (120)
drop policy: TAIL (141)
packet size fixup policy: NONE (0) no of global policers: 0
D/Traffic Shaping enabled
blt flags: 0x22A208C scheduler: 0x1A015D80
total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 9500 total
active 1
D/Traffic Shaping enabled
txcount 0 txqbytes 0 drops 0 qdrops 0 nobuffers 0 flowdrops 0
qsize 0 aggregate limit/bytes 128/375000 availbuffers 128
holdqueue_out 0 perc 0.00 remaining_ratio/perc 20
visible_bw 100 max_rate 15000 allocated_bw 100 vc_encap 0 ecn_threshold NONE
weight A 1 quantum A 1500 credit A 1500
weight B 1 quantum B 1500 credit B 1500
min-rate tokens: 1500, credit: 0, depth: 1500

backpressure_policy 0 scheduler_flags C03F
last_sortq[A/B] 0/0, remaining pak/particles 0/0
leaf_blt[P1] 0x1A015D80 burst packets/bytes[P1] 0/0
leaf_blt[P2] 0x1A015D80 burst packets/bytes[P2] 0/0
leaf_blt[NOTP] 0x1A015D80 burst packets/bytes[NOTP] 0/0

```

**show interface cable service-flow**

## OUTPUT Shaping

```

Bc internal 0 Be internal 0 Time interval 4
increment 15000 increment_lower 0 increment_limit 15000
last visit 0 credit 0 outstanding_tokens 0 maxtokens 32000000
system timer delayed 0 restart timer 0
timer set 0 hqf_shape_running 562
nextexpire_system_time 0 nextexpire_time_qindex -1

```

**Example of the show interface cable service-flow qos Command**

The following is a sample output of the **show interface cable service-flow qos** command:

Router# **show interfaces cable 6/1/0 service-flow qos**

| Sfid | Dir | Curr<br>State | Sid | Sched<br>Type | Prio | MaxSusRate | MaxBrst | MinRsvRate | Throughput |
|------|-----|---------------|-----|---------------|------|------------|---------|------------|------------|
| 5    | DS  | act           | N/A | BE            | 0    | 10000000   | 3044    | 0          | 0          |
| 30   | DS  | act           | N/A | BE            | 0    | 10000000   | 3044    | 0          | 0          |
| 31   | US  | act           | 12  | BE            | 0    | 64000      | 0       | 0          | 0          |
| 32   | DS  | act           | N/A | BE            | 0    | 10000000   | 0       | 0          | 0          |
| 33   | US  | act           | 13  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 35   | US  | act           | 14  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 34   | DS  | act           | N/A | BE            | 0    | 0          | 3044    | 0          | 0          |
| 36   | DS  | act           | N/A | BE            | 0    | 0          | 3044    | 0          | 0          |
| 37   | US  | act           | 15  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 45   | US  | act           | 19  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 38   | DS  | act           | N/A | BE            | 0    | 0          | 3044    | 0          | 0          |
| 46   | DS  | act           | N/A | BE            | 0    | 0          | 3044    | 0          | 0          |
| 39   | US  | act           | 16  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 47   | US  | act           | 20  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 40   | DS  | act           | N/A | BE            | 0    | 0          | 3044    | 0          | 0          |
| 48   | DS  | act           | N/A | BE            | 0    | 0          | 3044    | 0          | 0          |
| 41   | US  | act           | 17  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 43   | US  | act           | 18  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 42   | DS  | act           | N/A | BE            | 0    | 0          | 3044    | 0          | 0          |
| 44   | DS  | act           | N/A | BE            | 0    | 0          | 3044    | 0          | 0          |

**Example of the show interface cable service-flow qos us Command Output**

The following is a sample output for the **us** option of the **show interface cable service-flow qos** command:

Router# **show interfaces cable 6/1/0 service-flow qos us**

| Sfid | Dir | Curr<br>State | Sid | Sched<br>Type | Prio | MaxSusRate | MaxBrst | MinRsvRate | Throughput |
|------|-----|---------------|-----|---------------|------|------------|---------|------------|------------|
| 31   | US  | act           | 12  | BE            | 0    | 64000      | 0       | 0          | 0          |
| 33   | US  | act           | 13  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 35   | US  | act           | 14  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 37   | US  | act           | 15  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 45   | US  | act           | 19  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 39   | US  | act           | 16  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 47   | US  | act           | 20  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 41   | US  | act           | 17  | BE            | 0    | 0          | 3044    | 0          | 0          |
| 43   | US  | act           | 18  | BE            | 0    | 0          | 3044    | 0          | 0          |

**Example of the show interface cable service-flow qos service-class Command in Cisco IOS Release 12.2(33)SCF**

The following is a sample output for the **service-class** option of the **show interface cable service-flow qos** command:

Router# **show interfaces cable 6/1/0 service-flow qos service-class**

| Sfid | Dir | Sched<br>Type | MaxSusRate | MaxBrst | MinRsvRate | SrvClassName    |
|------|-----|---------------|------------|---------|------------|-----------------|
| 5    | DS  | BE            | 10000000   | 3044    | 0          | def_sclass      |
| 30   | DS  | BE            | 10000000   | 3044    | 0          | def_sclass      |
| 31   | US  | BE            | 64000      | 0       | 0          |                 |
| 32   | DS  | BE            | 1000000    | 0       | 0          |                 |
| 33   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts1 |
| 35   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts2 |
| 34   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts1 |
| 36   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts2 |
| 37   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts1 |
| 45   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts2 |
| 38   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts1 |
| 46   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts2 |
| 39   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts1 |
| 47   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts2 |
| 40   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts1 |
| 48   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts2 |
| 41   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts1 |
| 43   | US  | BE            | 0          | 3044    | 0          | us_srvclass_ts2 |
| 42   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts1 |
| 44   | DS  | BE            | 0          | 3044    | 0          | ds_srvclass_ts2 |

Table 223 shows the descriptions for the significant fields shown in the display:

**Table 223** *show interface cable service-flow Field Descriptions*

| Field                    | Description                                                                                                                                                                                                                                                                                                                  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sfid                     | Service flow identification number.<br><br><b>Note</b> Primary service flow IDs are displayed even for offline CMs because they are needed for modem re-registration.                                                                                                                                                        |
| Sid                      | Service identification number (upstream service flows only).                                                                                                                                                                                                                                                                 |
| Mac Address              | MAC address of the CM.                                                                                                                                                                                                                                                                                                       |
| QoS Parameter Index Prov | QoS parameter index for the Provisioned state of this flow.                                                                                                                                                                                                                                                                  |
| QoS Parameter Index Adm  | QoS parameter index for the Admitted state of this flow.                                                                                                                                                                                                                                                                     |
| QoS Parameter Index Act  | QoS parameter index for the Active state of this flow.                                                                                                                                                                                                                                                                       |
| Type                     | Indicates if the service flow is the primary flow or a secondary service flow. Secondary service flows are also identified by an “S” (created statically at the time of registration, using the DOCSIS configuration file) or “D” (created dynamically by the exchange of dynamic service messages between the CM and CMTS). |
| Dir                      | Downstream (DS) or upstream (US) service flow.                                                                                                                                                                                                                                                                               |
| Curr State               | Current run-time state of the service flow.                                                                                                                                                                                                                                                                                  |
| Active Time              | Length of time this service flow has been active.                                                                                                                                                                                                                                                                            |
| BG/CH                    | BGID or the DS channel ID of the forwarding interface assigned to the downstream service flow.                                                                                                                                                                                                                               |
| Len/Limit Pkts           | Length or limit of the packets.                                                                                                                                                                                                                                                                                              |
| Deqs Pkts                | Dequeue packets                                                                                                                                                                                                                                                                                                              |
| Drops Pkts               | Dropped packets.                                                                                                                                                                                                                                                                                                             |
| CIR Kbps                 | Committed information rate.                                                                                                                                                                                                                                                                                                  |

**Table 223** *show interface cable service-flow Field Descriptions (continued)*

| Field        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MIR/PR Kbps  | Maximum information and peak rate.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Forwint      | Forwarding interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| SFID         | Service flow identifier.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Sched Type   | Identifies scheduling type of this service flow: <ul style="list-style-type: none"> <li>• BE—Best-Effort</li> <li>• N/A—Scheduling type is not applicable to a service-flow.</li> <li>• NRTPS—Non-Real-Time Polling Service</li> <li>• RTPS—Real-Time Polling Service</li> <li>• RSVD—Reserved but not yet in use</li> <li>• UGS_AD—Unsolicited Grant Service with Activity Detection</li> <li>• UGS—Unsolicited Grant Service</li> <li>• UNDEF—Not yet defined.</li> </ul> |
| Prio         | Traffic priority (0 to 7) given to this service flow.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| MaxSusRate   | Maximum sustained rate value, in bits per second.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| MaxBrst      | Maximum burst value, in bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| MinRsvRate   | Minimum reserved rate, in bits per second.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Throughput   | Current throughput for this service flow, in packets per second.                                                                                                                                                                                                                                                                                                                                                                                                            |
| SrvClassName | Service class name associated with the service flow.                                                                                                                                                                                                                                                                                                                                                                                                                        |

**Note**

The PHS packet counters are not supported on the Cisco uBR10-MC5X20 card and always shows 0 or N/A, depending on the software release.

The following example shows upstream bonding information on a cable interface line card in Cisco IOS Release 12.2(33)SCC:

```
Routeru# show interface cable 5/0/1 service-flow 3070 verbose
```

```

Sfid : 3070
Mac Address : 001a.c3ff.d59c
Type : Secondary(Static)
Direction : Upstream
Current State : Active
Current QoS Indexes [Prov, Adm, Act] : [6, 6, 6]
Active Time : 07:48
Required Attributes : 0x00000000
Forbidden Attributes : 0x00000000
Aggregate Attributes : 0x00000000
Sid : 720
Traffic Priority : 0
Maximum Sustained rate : 1000000 bits/sec
Maximum Burst : 1522 bytes
Minimum Reserved Rate : 0 bits/sec
Minimum Packet Size : 0 bytes
Admitted QoS Timeout : 200 seconds
Active QoS Timeout : 0 seconds

```

```

Packets : 58381
Bytes : 29891072
Rate Limit Delayed Grants : 63
Rate Limit Dropped Grants : 29058
Current Throughput : 1108314 bits/sec, 270 packets/sec
Application Priority : 0
US Bonded : YES
Upstream Bonding Group : UBG-1
Transmit Channel Set : 0xF
Sid Cluster : SC-0, Sid [720 720 720 720]
Segments Valid : 24201
Segments Discarded : 0
Segments Lost : 0
SID Cluster Switching Information
Total Bytes Requested : 0
Total Time : 0
Outstanding Bytes : 0
Max Requests : 1
Classifiers:

Classifier Id : 1
Service Flow Id : 3070
CM Mac Address : 001a.c3ff.d59c
Direction : upstream
Activation State : active
Classifier Matching Priority : 1
PHSI : 0
Number of matches : 58381
IP Classification Parameters:
 Destination IP Address : 192.168.24.0
 Destination IP Address Mask : 255.255.255.0 Chicago10k#

```

The following example shows the output of the **show interface cable service-flow counters** command displaying the service flow counters on the cable interface at slot/subslot/port 7/1/0:

Router# **show interface cable 7/1/0 service-flow 7 counters**

| Sfid | Packets | Bytes | PacketDrop | Bits/Sec | Packet/Sec |
|------|---------|-------|------------|----------|------------|
| 7    | 16      | 8384  | 0          | 0        | 0          |

Table 224 shows the significant fields shown in the display for the **phs** option:

**Table 224** *show interface cable service-flow phs Field Descriptions*

| Field | Description                                                                                                                                                           |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sfid  | Service flow identification number.<br><br><b>Note</b> Primary service flow IDs are displayed even for offline CMs because they are needed for modem re-registration. |
| PHSI  | PHS Index. Number that uniquely references the PHS rule.                                                                                                              |
| PHSS  | PHS Size. 8-bit value specifying the number of header bytes to be suppressed.                                                                                         |
| PHSV  | PHS Verify. Indicates whether PHS verification is enabled.                                                                                                            |
| PHSM  | PHS Mask. 5-bit PHS mask that defines the header bytes that should be suppressed.                                                                                     |
| PHSF  | PHS Field. 8-bit values that defines the header bytes that should be suppressed.                                                                                      |

 show interface cable service-flow

| Related Commands | Command                                        | Description                                                                                                             |
|------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable service class</b>                     | Sets the parameters for DOCSIS 1.1 cable service class.                                                                 |
|                  | <b>cable service flow inactivity-threshold</b> | Sets the inactivity threshold value for service flows using Unsolicited Grant Service with Activity Detection (UGS-AD). |
|                  | <b>cable service-flow inactivity-timeout</b>   | Sets the amount of time a dynamic service-flow can be present in the system without any activity.                       |
|                  | <b>show cable qos permission</b>               | Displays the status of permissions for changing QoS tables.                                                             |
|                  | <b>show cable qos profile</b>                  | Displays the QoS profiles that have been defined.                                                                       |



# show interface cable sid

To display the service identifier (SID) information for a cable modem (CM), use the **show interface cable sid** command in privileged EXEC mode.

```
show interface cable { slot/port | slot/subslot/port } sid id [association | connectivity | counters | qos | secondary-ip | rate-adapt] [verbose]
```

**Cisco IOS Release 12.2(33)SCE and later**

```
show interface cable { slot/cable-interface-index | slot/subslot/cable-interface-index } sid id [association | connectivity | counters | qos | secondary-ip | rate-adapt] [verbose]
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                 |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                               |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |
| <i>id</i>                    | The service identification information number. The valid range is 1-8176.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>association</b>           | Displays the virtual interfaces (VRF) or Interface Descriptor Blocks (IDBs).                                                                                                                                                                                                                                                                                                                                                                 |
| <b>connectivity</b>          | Displays the values of the per-SID connectivity statistics. (This option appears only in DOCSIS 1.0 and 1.0+ releases. Use the <b>show cable modem connectivity</b> command in DOCSIS 1.1 releases.)                                                                                                                                                                                                                                         |
| <b>counters</b>              | Displays the values of the per-SID usage counters. Same as the keyword <b>stats</b> that appeared in Cisco IOS Release 11.3(5)NA and earlier releases.                                                                                                                                                                                                                                                                                       |
| <b>qos</b>                   | Displays the QoS characteristics received by each SID.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>secondary-ip</b>          | Displays the secondary IP addresses associated with each SID.                                                                                                                                                                                                                                                                                                                                                                                |

|                   |                                                                                                                                                                                |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>rate-adapt</b> | (Cisco uBR7200 series and Cisco uBR10012 routers only) Displays the local or global upstream utilization optimization configuration parameters.                                |
| <b>verbose</b>    | Displays detailed information for the <b>counters</b> and <b>qos</b> options.                                                                                                  |
| <b>Note</b>       | The <b>verbose</b> option is supported by itself or with any of the other options, but it displays additional information only for the <b>counters</b> and <b>qos</b> options. |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release                              | Modification                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 XA                              | This command was introduced.                                                                                                                                                                                                                                                                                                                            |
| 11.3(6)NA                            | The keyword <b>stats</b> was changed to <b>counters</b> .                                                                                                                                                                                                                                                                                               |
| 12.0(4)XI                            | The primary SID information was added.                                                                                                                                                                                                                                                                                                                  |
| 12.0(5)T                             | The command output was modified to identify secondary SIDs.                                                                                                                                                                                                                                                                                             |
| 12.0(7)XR and 12.0(7)T               | The <b>verbose</b> keyword was added to display additional information for the <b>counters</b> option.                                                                                                                                                                                                                                                  |
| 12.1(4)CX, 12.2(1)XF, and 12.2(4)BC1 | The <b>qos</b> keyword was added to display information on the QoS values received by the SID from the MAC scheduler. You can also use the <b>verbose</b> option with the <b>qos</b> keyword to display detailed information.<br><br>Also, the <b>connectivity</b> option was removed and replaced by the <b>show cable modem connectivity</b> command. |
| 12.1(11b)EC, 12.2(8)BC1              | The <b>association</b> keyword was added.                                                                                                                                                                                                                                                                                                               |
| 12.2(8)BC2                           | An explicit error message was added if this command is used with a cable subinterface, instructing the user to use the main interface instead.                                                                                                                                                                                                          |
| 12.1(13)EC                           | The <b>secondary-ip</b> keyword was added for the Cisco uBR7100 series and Cisco uBR7200 series universal broadband routers.                                                                                                                                                                                                                            |
| 12.2(11)BC1                          | Support for the <b>secondary-ip</b> keyword was added for the Cisco uBR10012 universal broadband router.                                                                                                                                                                                                                                                |
| 12.2(11)CY, 12.2(11)BC3              | Three codeword fields were added to the <b>verbose</b> counters display to support the Cisco uBR10-MC5X20S cable interface line card. These fields always display zero for the other cable interface line cards.                                                                                                                                        |
| 12.2(11)BC3                          | The <b>counters</b> option now displays the following counters: <ul style="list-style-type: none"> <li>Concatenated headers received</li> <li>Fragmentation headers received</li> <li>Fragmentation headers discarded</li> </ul> <b>Note</b> The Cisco uBR10-MC5X20S cable interface line card does not currently support these particular counters.    |

| Release     | Modification                                                                                                                                                                                                                                                                                         |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>The “Dual IP” output field was added to indicate support of both IPv4 and IPv6 addressing.</li> </ul> |
| 12.3(23)BC2 | This command was modified to add two rate-adapt output fields to the <b>counters verbose</b> form of the command.                                                                                                                                                                                    |
| 12.2(33)SCB | The two rate-adapt output fields in the <b>counters verbose</b> form of the command were integrated into Cisco IOS Release 12.2(33)SCB.                                                                                                                                                              |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards.                                                                                      |

### Usage Guidelines

Data transport over the radio frequency (RF) link uses the registered SID address rather than the Ethernet address. This allows multiple hosts to access the network via a single CM.

The **verbose** keyword can be used with any of the other options or by itself, but it displays additional information only when used with the **counters**, **qos**, and **rate-adapt** options.



#### Note

You can specify only a main interface with this command, not a subinterface.



#### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

### Examples

This section shows the output from the different forms of the **show interface cable sid** command.

The following example shows the error message that is displayed when you attempt to use this command on a subinterface:

```
Router# show interface cable 6/0.1 sid
```

```
Command not allowed on sub-interface
Please use main interface C6/0
```

#### show interface cable sid Examples

```
Router# show interface cable 4/0 sid
```

| Sid | Prim | MAC Address    | IP Address    | Type | Age     | Admin State | Sched Type | Sfid |
|-----|------|----------------|---------------|------|---------|-------------|------------|------|
| 5   |      | 0010.7b6b.58c1 | 10.20.114.34  | stat | 2d1h36m | enable      | BE         | 1    |
| 6   |      | 0010.7bed.9dc9 | 10.20.114.37  | stat | 2d1h36m | enable      | BE         | 13   |
| 7   |      | 0010.7bed.9dbb | 10.20.114.38  | stat | 2d1h36m | enable      | BE         | 15   |
| 8   |      | 0010.7b6b.58bb | 10.20.114.112 | stat | 2d1h34m | enable      | BE         | 17   |
| 9   |      | 0010.7b6b.58bb | 10.20.114.112 | dyna | 2d1h34m | enable      | BE         | 19   |

## show interface cable sid

The following example shows output from the **show interface cable modem** command in Cisco IOS Release 12.2(33)SCA for all SIDs on a particular cable interface on a Cisco uBR10012 router. None of the CMs or CPEs are supporting both IPv4 and IPv6 addressing, which is indicated by the “N” in the Dual IP output field.:

```
Router# show interface cable 8/0/0 sid
Sid Prim MAC Address IP Address Type Age Admin Sched Sfid Dual
 State Type
1 0008.0da6.1c47 50.3.134.12 stat 41:58 enable BE 3 N
2 0008.0da5.6e48 50.3.134.2 stat 41:58 enable BE 5 N
3 0008.0da6.0447 50.3.134.13 stat 41:55 enable BE 7 N
4 0008.0da6.3447 50.3.134.3 stat 41:56 enable BE 9 N
5 0011.8065.e78e 50.3.134.38 stat 40:52 enable BE 11 N
6 0000.cab7.8620 50.3.134.8 stat 41:25 enable BE 13 N
7 0011.8065.e7a6 50.3.134.10 stat 40:52 enable BE 15 N
8 0006.53b6.57f5 50.3.134.9 stat 41:34 enable BE 17 N
9 0006.53b6.581d 50.3.134.27 stat 41:08 enable BE 19 N
10 0007.0e04.ebfd 50.3.134.5 stat 41:04 enable BE 21 N
```

Table 227 describes the fields displayed by the **show interface cable sid** command.

**Table 225** *show interface cable sid Field Descriptions*

| Field       | Description                                                                                                                                                                                                                                                                            |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sid         | Service identification number.                                                                                                                                                                                                                                                         |
| Prim        | The primary service identifier (SID) assigned to the modem.                                                                                                                                                                                                                            |
| MAC address | MAC address of the modem owning this SID.                                                                                                                                                                                                                                              |
| IP address  | IP address of the modem owning this SID.                                                                                                                                                                                                                                               |
| Type        | Indicates whether this SID was created statically (“stat”) at the time of registration, or dynamically (“dyna”) by the exchange of dynamic service messages between the CM and CMTS.                                                                                                   |
| Age         | Length of time that the SID has been enabled.                                                                                                                                                                                                                                          |
| Admin State | Administrative state of the SID, where “Disable” means that the SID has been turned off. “Enable” is the normal state.                                                                                                                                                                 |
| Sched Type  | The service class schedule type, where:<br>2–Best-Effort Schedule Type<br>3–Non-Real-Time Polling Service Schedule Type<br>4–Real-Time Polling Service Schedule Type<br>5–Unsolicited Grant Service with Activity Detection Schedule Type<br>6–Unsolicited Grant Service Schedule Type |
| Sfid        | Service flow identifier.                                                                                                                                                                                                                                                               |
| Dual IP     | Identifies whether or not (“Y” or “N”) the CM or CPE supports both IPv4 and IPv6 addressing.                                                                                                                                                                                           |

## show interface cable sid qos Examples

```
Router# show interface cable 4/0 sid qos
```

```
Sid Pr MaxSusRate MinRsvRate Sched Grant Grant GPI Poll Thrput
 Type Size Intvl Type Size Intvl Intvl
5 0 64000 0 BE 0 0 0 0 0
6 0 64000 0 BE 0 0 0 0 0
```

```

7 0 64000 0 BE 0 0 0 0 0
8 0 64000 0 BE 0 0 0 0 0

```

Router# **show interface cable 4/0 sid 5 qos**

| Sid | Pr | MaxSusRate | MinRsvRate | Sched Type | Grant Size | Grant Intvl | GPI | Poll Intvl | Thruput |
|-----|----|------------|------------|------------|------------|-------------|-----|------------|---------|
| 5   | 0  | 64000      | 0          | BE         | 0          | 0           | 0   | 0          | 0       |

### show interface cable sid qos verbose Examples

Router# **show interface cable 4/0 sid 5 qos verbose**

```

Sid : 5
Traffic Priority : 0
Maximum Sustained Rate : 64000
Maximum Burst : 0
Minimum Reserved Rate : 0
Minimum Packet Size : 0
Maximum Concatenated Burst : 1522
Scheduling Type : Best Effort
Nominal Grant Interval : 0
Tolerated Grant Jitter : 0
Nominal Polling Interval : 0
Tolerated Polling Jitter : 0
Unsolicited Grant Size : 0
Grants per Interval : 0
Request/Transmission Policy : 0x0
IP ToS Overwrite [AND-mask, OR-mask] : 0x0, 0x0
Current Throughput : 0 bits/sec, 0 packets/sec

```

### show interface cable sid counter Examples

When using DOCSIS 1.1 software, such as Cisco IOS Release 12.2 BC, the **show interface sid counter** command provides the following display:

Router# **show interface cable 5/0 sid counter**

| Sid | Req-polls issued | BW-reqs received | Grants issued | Packets received | Frag complete | Concatpkts received |
|-----|------------------|------------------|---------------|------------------|---------------|---------------------|
| 1   | 0                | 22               | 22            | 22               | 0             | 0                   |
| 2   | 0                | 3                | 3             | 2                | 0             | 0                   |
| 3   | 0                | 0                | 0             | 0                | 0             | 0                   |

When using DOCSIS 1.0 software, such as Cisco IOS Release 12.1 EC, the **show interface sid counter** command provides the following display:

Router# **show interface cable 5/0 sid counter**

| Sid | Inpackets | Inoctets | Outpackets | Outoctets | Ratelimit BWReqDrop | Ratelimit DSPktDrop |
|-----|-----------|----------|------------|-----------|---------------------|---------------------|
| 6   | 51        | 6559     | 42         | 3580      | 0                   | 0                   |
| 7   | 47        | 5993     | 40         | 3428      | 0                   | 0                   |
| 8   | 47        | 6136     | 36         | 3122      | 0                   | 0                   |
| 9   | 0         | 0        | 0          | 0         | 0                   | 0                   |

### show interface cable sid counter verbose Examples

The following example shows typical verbose output for the SID counters on a Cisco uBR-MCxC cable interface line card:

Router# **show interface cable 4/0 sid 3 counter verbose**

```

Sid : 3
Request polls issued : 0
BW requests received : 1

```

**show interface cable sid**

```

No grant buf BW request drops : 0
Rate exceeded BW request drops : 0
Grants issued : 1
Packets received : 0
Bytes received : 0
Fragment reassembly completed : 0
Fragment reassembly incomplete : 0
Concatenated packets received : 0
Queue-indicator bit statistics : 0 set, 0 granted
Good Codewords rx : 0
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0
Concatenated headers received : 0
Fragmentation headers received : 0
Fragmentation headers discarded: 0

```

The following example shows typical verbose output for the SID counters on the Cisco uBR10-MC5X20S cable interface line card:

Router# **show interface cable 4/0 sid 3 counters verbose**

```

Sid : 1
Request polls issued : 0
BWReqs {Cont,Pigg,RPoll,Other} : 0, 1052, 1052, 0
No grant buf BW request drops : 0
Rate exceeded BW request drops : 0
Grants issued : 1052
Packets received : 0
Bytes received : 0
Fragment reassembly completed : N/A
Fragment reassembly incomplete : N/A
Concatenated packets received : N/A
Queue-indicator bit statistics : 0 set, 0 granted
Good Codewords rx : 53
Corrected Codewords rx : 6110
Uncorrectable Codewords rx : 8540896
Concatenated headers received : 235
Fragmentation headers received : 0
Fragmentation headers discarded: 0

```

**Note**

Because the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR10-MC5X20S/U/H cable interface line cards do not support the fragmentation and concatenation packet counters, these counters always show zero for these particular cable interfaces. However, these interfaces do accurately count the number of concatenation headers, as shown above.

**show interface cable sid association Example**

The following example shows typical output for the **association** keyword:

Router# **show interface cable 5/0 sid association**

| Sid | Prim | Online  | IP Address     | MAC Address    | Interface | VRF Name |
|-----|------|---------|----------------|----------------|-----------|----------|
| 1   |      | online  | 192.168.129.20 | 0003.e38f.e993 | Ca5/0.50  | green    |
| 2   |      | online  | 192.168.129.17 | 0003.e38f.e89d | Ca5/0.50  | green    |
| 3   |      | init(t) | 192.168.129.12 | 00d0.baa2.fb93 | Ca5/0.50  | green    |

**Note**

The output of the **show interface cable sid association** command output will not display the updated interface name immediately after deleting a VRF. This is because the SID is not re-mapped automatically to the interface on which the CM comes online. If you want to view the updated interface name, reset the cable modem to re-map the interface name and then execute this show command.

The following example shows sample output for the **secondary-ip** keyword:

```
Router# show interface cable 5/0 sid secondary-ip
For sid 1 secondary ip list contains 2 address(es)
 192.168.129.20
 192.168.81.123
For sid 2 secondary ip list contains 2 address(es)
 192.168.129.17
 10.10.11.3
```



**Tip**

One possible situation that might occur is if a CM first assigns a secondary IP address to one CPE device, but later that same IP address is assigned to another CPE device behind a different CM. If this happens, the IP address will continue to show up as a secondary IP address for the original CM until that CM renews its public keys. This will not affect network connectivity for either CPE or CM. You can, however, clear the unneeded secondary IP address from the CMTS database using the **clear cable secondary-ip** command.

Table 228 describes the fields displayed by the **show interface cable sid** command.

**Table 226** *show interface cable sid Field Descriptions*

| Field                          | Description                                                                                                                                                    |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sid                            | Service identification number.                                                                                                                                 |
| Prim Sid                       | The primary service identifier (SID) assigned to the modem.                                                                                                    |
| Type                           | Indicates that this SID was created statically at the time of registration or dynamically by the exchange of dynamic service messages between the CM and CMTS. |
| Online State<br>Offline State  | “Online” means that the modem owning this SID is processing traffic. “Offline” means that the modem owning this SID is not processing traffic.                 |
| Admin Status                   | “Disable” means that the SID has been turned off. “Enable” is the normal state.                                                                                |
| QoS                            | Quality of service.                                                                                                                                            |
| Create time                    | When the SID was created, number of seconds since the system booted.                                                                                           |
| Input octets (In octets)       | Number of octets received by using this SID.                                                                                                                   |
| Input packets (In packets)     | Number of packets received by using this SID.                                                                                                                  |
| Output octets (Out octets)     | Number of octets sent from this SID.                                                                                                                           |
| Output packets (Out packets)   | Number of packets sent from this SID.                                                                                                                          |
| IP address                     | IP address of the modem owning this SID.                                                                                                                       |
| MAC address                    | MAC address of the modem owning this SID.                                                                                                                      |
| BW requests received           | Number of bandwidth requests received by this SID.                                                                                                             |
| Grants issued                  | Number of bandwidth requests granted by this SID.                                                                                                              |
| Rate exceeded BW request drops | Number of bandwidth requests not granted by this SID.                                                                                                          |
| Rate exceeded DS packet drops  | Number of downstream packets lost by this SID.                                                                                                                 |
| Ratelimit BWReqDrop            | Number of bandwidth requests not granted by this SID.                                                                                                          |
| Ratelimit DSPktDrop            | Number of downstream packets lost by this SID.                                                                                                                 |

**Table 226**      *show interface cable sid Field Descriptions (continued)*

| Field                          | Description                                                                                                                                                                                                                                                                     |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1st time online                | Time at which the modem with this SID connected.                                                                                                                                                                                                                                |
| Times online                   | Number of times the modem with this SID connected.                                                                                                                                                                                                                              |
| % online                       | Percentage of time the modem with this SID has been connected.                                                                                                                                                                                                                  |
| Online time                    | The minimum, average, and maximum number of hours and minutes the modem with this SID has been connected.<br><br><b>Note</b> A CM is considered online when it has completed the registration process and has communicated with the DHCP, TFTP, and TOD servers.                |
| Offline time                   | The minimum, average, and maximum number of hours and minutes the modem with this SID has been disconnected.<br><br><b>Note</b> A CM is considered offline after it has missed 16 consecutive station maintenance messages.                                                     |
| MaxSusRate                     | The maximum rate (0 to 4,294,967,295 bps).                                                                                                                                                                                                                                      |
| MinRsvRate                     | The minimum guaranteed rate (0 to 4,294,967,295 bps).                                                                                                                                                                                                                           |
| Sched Type                     | The service class schedule type:<br>2–Best-Effort Schedule Type<br>3–Non-Real-Time Polling Service Schedule Type<br>4–Real-Time Polling Service Schedule Type<br>5–Unsolicited Grant Service with Activity Detection Schedule Type<br>6–Unsolicited Grant Service Schedule Type |
| Grant Size                     | The grant size (0 to 65535 bytes).                                                                                                                                                                                                                                              |
| Grant Interval                 | The grant interval (0 to 4294967295 microseconds).                                                                                                                                                                                                                              |
| GPI                            | The grants per interval (0 to 127 grants).                                                                                                                                                                                                                                      |
| Poll Interval                  | The poll interval (0 to 4294967295 microseconds).                                                                                                                                                                                                                               |
| Throughput                     | The overall throughput for this SID.                                                                                                                                                                                                                                            |
| VRF Name                       | Name of the virtual interface that has been configured for Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) operation.                                                                                                                                        |
| Fragment reassembly completed  | Number of packets that were subject to DOCSIS fragmentation that were successfully reassembled.<br><br><b>Note</b> This counter is not supported on the Cisco uBR10-MC5X20 card and always shows 0 or N/A, depending on the software release.                                   |
| Fragment reassembly incomplete | Number of packets that were subject to DOCSIS fragmentation that have not yet been successfully reassembled.<br><br><b>Note</b> This counter is not supported on the Cisco uBR10-MC5X20 card and always shows 0 or N/A, depending on the software release.                      |



**Table 226** *show interface cable sid Field Descriptions (continued)*

| Field                           | Description                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Concatenated packets received   | Number of packets that were subject to DOCSIS concatenation that were successfully received.<br><br><b>Note</b> This counter is not supported on the Cisco uBR10-MC5X20 card and always shows 0 or N/A, depending on the software release. |
| Good Codewords rx               | Number of FEC codewords received without error.                                                                                                                                                                                            |
| Corrected Codewords rx          | Number of FEC codewords received with errors that could be corrected.                                                                                                                                                                      |
| Uncorrectable Codewords rx      | Number of FEC codewords received with errors that could not be corrected.                                                                                                                                                                  |
| Concatenated packets received   | Number of concatenation headers received on an upstream service flow. (This field always shows 0 for the Cisco uBR10012 router, but you can use the docsQosUpstreamConcatBursts attribute in DOCS-QOS-MIB to get a current count.)         |
| Fragmentation headers received  | Number of fragmentation headers received on an upstream service flow, regardless of whether the fragment was correctly reassembled into a valid packet. (See docsQosUpstreamFragments in DOCS-QOS-MIB.)                                    |
| Fragmentation headers discarded | Number of upstream fragments discarded and not assembled into a valid upstream packet. (See docsQosUpstreamFragDiscards in DOCS-QOS-MIB.)                                                                                                  |

**Related Commands**

| Command                                    | Description                                                                               |
|--------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>clear cable secondary-ip</b>            | Clears the router's table that links secondary IP addresses to the devices that use them. |
| <b>show cable modem connectivity</b>       | Displays connectivity statistics for one or more CMs.                                     |
| <b>show interface cable signal-quality</b> | Displays information about the cable signal quality.                                      |

# show interface cable sid

To display the service identifier (SID) information for a cable modem (CM), use the **show interface cable sid** command in privileged EXEC mode.

```
show interface cable {slot/port | slot/subslot/port} sid id [association | connectivity | counters |
qos | secondary-ip | rate-adapt] [verbose]
```

**Cisco IOS Release 12.2(33)SCE and later**

```
show interface cable {slot/cable-interface-index | slot/subslot/cable-interface-index} sid id
[association | connectivity | counters | qos | secondary-ip | rate-adapt] [verbose]
```

## Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                 |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                               |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |
| <i>id</i>                    | The service identification information number. The valid range is 1-8176.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>association</b>           | Displays the virtual interfaces (VRF) or Interface Descriptor Blocks (IDBs).                                                                                                                                                                                                                                                                                                                                                                 |
| <b>connectivity</b>          | Displays the values of the per-SID connectivity statistics. (This option appears only in DOCSIS 1.0 and 1.0+ releases. Use the <b>show cable modem connectivity</b> command in DOCSIS 1.1 releases.)                                                                                                                                                                                                                                         |
| <b>counters</b>              | Displays the values of the per-SID usage counters. Same as the keyword <b>stats</b> that appeared in Cisco IOS Release 11.3(5)NA and earlier releases.                                                                                                                                                                                                                                                                                       |
| <b>qos</b>                   | Displays the QoS characteristics received by each SID.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>secondary-ip</b>          | Displays the secondary IP addresses associated with each SID.                                                                                                                                                                                                                                                                                                                                                                                |

|                   |                                                                                                                                                                                |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>rate-adapt</b> | (Cisco uBR7200 series and Cisco uBR10012 routers only) Displays the local or global upstream utilization optimization configuration parameters.                                |
| <b>verbose</b>    | Displays detailed information for the <b>counters</b> and <b>qos</b> options.                                                                                                  |
| <b>Note</b>       | The <b>verbose</b> option is supported by itself or with any of the other options, but it displays additional information only for the <b>counters</b> and <b>qos</b> options. |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release                              | Modification                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 XA                              | This command was introduced.                                                                                                                                                                                                                                                                                                                            |
| 11.3(6)NA                            | The keyword <b>stats</b> was changed to <b>counters</b> .                                                                                                                                                                                                                                                                                               |
| 12.0(4)XI                            | The primary SID information was added.                                                                                                                                                                                                                                                                                                                  |
| 12.0(5)T                             | The command output was modified to identify secondary SIDs.                                                                                                                                                                                                                                                                                             |
| 12.0(7)XR and 12.0(7)T               | The <b>verbose</b> keyword was added to display additional information for the <b>counters</b> option.                                                                                                                                                                                                                                                  |
| 12.1(4)CX, 12.2(1)XF, and 12.2(4)BC1 | The <b>qos</b> keyword was added to display information on the QoS values received by the SID from the MAC scheduler. You can also use the <b>verbose</b> option with the <b>qos</b> keyword to display detailed information.<br><br>Also, the <b>connectivity</b> option was removed and replaced by the <b>show cable modem connectivity</b> command. |
| 12.1(11b)EC, 12.2(8)BC1              | The <b>association</b> keyword was added.                                                                                                                                                                                                                                                                                                               |
| 12.2(8)BC2                           | An explicit error message was added if this command is used with a cable subinterface, instructing the user to use the main interface instead.                                                                                                                                                                                                          |
| 12.1(13)EC                           | The <b>secondary-ip</b> keyword was added for the Cisco uBR7100 series and Cisco uBR7200 series universal broadband routers.                                                                                                                                                                                                                            |
| 12.2(11)BC1                          | Support for the <b>secondary-ip</b> keyword was added for the Cisco uBR10012 universal broadband router.                                                                                                                                                                                                                                                |
| 12.2(11)CY, 12.2(11)BC3              | Three codeword fields were added to the <b>verbose</b> counters display to support the Cisco uBR10-MC5X20S cable interface line card. These fields always display zero for the other cable interface line cards.                                                                                                                                        |
| 12.2(11)BC3                          | The <b>counters</b> option now displays the following counters: <ul style="list-style-type: none"> <li>Concatenated headers received</li> <li>Fragmentation headers received</li> <li>Fragmentation headers discarded</li> </ul> <b>Note</b> The Cisco uBR10-MC5X20S cable interface line card does not currently support these particular counters.    |

| Release     | Modification                                                                                                                                                                                                                                                                                         |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA, with the following changes: <ul style="list-style-type: none"> <li>Support for the Cisco uBR7225VXR router was added.</li> <li>The “Dual IP” output field was added to indicate support of both IPv4 and IPv6 addressing.</li> </ul> |
| 12.3(23)BC2 | This command was modified to add two rate-adapt output fields to the <b>counters verbose</b> form of the command.                                                                                                                                                                                    |
| 12.2(33)SCB | The two rate-adapt output fields in the <b>counters verbose</b> form of the command were integrated into Cisco IOS Release 12.2(33)SCB.                                                                                                                                                              |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards.                                                                                      |

### Usage Guidelines

Data transport over the radio frequency (RF) link uses the registered SID address rather than the Ethernet address. This allows multiple hosts to access the network via a single CM.

The **verbose** keyword can be used with any of the other options or by itself, but it displays additional information only when used with the **counters**, **qos**, and **rate-adapt** options.



#### Note

You can specify only a main interface with this command, not a subinterface.



#### Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

### Examples

This section shows the output from the different forms of the **show interface cable sid** command.

The following example shows the error message that is displayed when you attempt to use this command on a subinterface:

```
Router# show interface cable 6/0.1 sid
```

```
Command not allowed on sub-interface
Please use main interface C6/0
```

#### show interface cable sid Examples

```
Router# show interface cable 4/0 sid
```

| Sid | Prim | MAC Address    | IP Address    | Type | Age     | Admin State | Sched Type | Sfid |
|-----|------|----------------|---------------|------|---------|-------------|------------|------|
| 5   |      | 0010.7b6b.58c1 | 10.20.114.34  | stat | 2d1h36m | enable      | BE         | 1    |
| 6   |      | 0010.7bed.9dc9 | 10.20.114.37  | stat | 2d1h36m | enable      | BE         | 13   |
| 7   |      | 0010.7bed.9dbb | 10.20.114.38  | stat | 2d1h36m | enable      | BE         | 15   |
| 8   |      | 0010.7b6b.58bb | 10.20.114.112 | stat | 2d1h34m | enable      | BE         | 17   |
| 9   |      | 0010.7b6b.58bb | 10.20.114.112 | dyna | 2d1h34m | enable      | BE         | 19   |

The following example shows output from the **show interface cable modem** command in Cisco IOS Release 12.2(33)SCA for all SIDs on a particular cable interface on a Cisco uBR10012 router. None of the CMs or CPEs are supporting both IPv4 and IPv6 addressing, which is indicated by the “N” in the Dual IP output field.:

```
Router# show interface cable 8/0/0 sid
Sid Prim MAC Address IP Address Type Age Admin Sched Sfid Dual
 State Type
1 0008.0da6.1c47 50.3.134.12 stat 41:58 enable BE 3 N
2 0008.0da5.6e48 50.3.134.2 stat 41:58 enable BE 5 N
3 0008.0da6.0447 50.3.134.13 stat 41:55 enable BE 7 N
4 0008.0da6.3447 50.3.134.3 stat 41:56 enable BE 9 N
5 0011.8065.e78e 50.3.134.38 stat 40:52 enable BE 11 N
6 0000.cab7.8620 50.3.134.8 stat 41:25 enable BE 13 N
7 0011.8065.e7a6 50.3.134.10 stat 40:52 enable BE 15 N
8 0006.53b6.57f5 50.3.134.9 stat 41:34 enable BE 17 N
9 0006.53b6.581d 50.3.134.27 stat 41:08 enable BE 19 N
10 0007.0e04.ebfd 50.3.134.5 stat 41:04 enable BE 21 N
```

Table 227 describes the fields displayed by the **show interface cable sid** command.

**Table 227** *show interface cable sid Field Descriptions*

| Field       | Description                                                                                                                                                                                                                                                                            |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sid         | Service identification number.                                                                                                                                                                                                                                                         |
| Prim        | The primary service identifier (SID) assigned to the modem.                                                                                                                                                                                                                            |
| MAC address | MAC address of the modem owning this SID.                                                                                                                                                                                                                                              |
| IP address  | IP address of the modem owning this SID.                                                                                                                                                                                                                                               |
| Type        | Indicates whether this SID was created statically (“stat”) at the time of registration, or dynamically (“dyna”) by the exchange of dynamic service messages between the CM and CMTS.                                                                                                   |
| Age         | Length of time that the SID has been enabled.                                                                                                                                                                                                                                          |
| Admin State | Administrative state of the SID, where “Disable” means that the SID has been turned off. “Enable” is the normal state.                                                                                                                                                                 |
| Sched Type  | The service class schedule type, where:<br>2–Best-Effort Schedule Type<br>3–Non-Real-Time Polling Service Schedule Type<br>4–Real-Time Polling Service Schedule Type<br>5–Unsolicited Grant Service with Activity Detection Schedule Type<br>6–Unsolicited Grant Service Schedule Type |
| Sfid        | Service flow identifier.                                                                                                                                                                                                                                                               |
| Dual IP     | Identifies whether or not (“Y” or “N”) the CM or CPE supports both IPv4 and IPv6 addressing.                                                                                                                                                                                           |

#### show interface cable sid qos Examples

```
Router# show interface cable 4/0 sid qos
```

```
Sid Pr MaxSusRate MinRsvRate Sched Grant Grant GPI Poll Thrput
 Type Size Intvl Type Size Intvl Intvl
5 0 64000 0 BE 0 0 0 0 0
6 0 64000 0 BE 0 0 0 0 0
```

**show interface cable sid**

```

7 0 64000 0 BE 0 0 0 0 0
8 0 64000 0 BE 0 0 0 0 0

```

Router# **show interface cable 4/0 sid 5 qos**

| Sid | Pr | MaxSusRate | MinRsvRate | Sched Type | Grant Size | Grant Intvl | GPI | Poll Intvl | Thrput |
|-----|----|------------|------------|------------|------------|-------------|-----|------------|--------|
| 5   | 0  | 64000      | 0          | BE         | 0          | 0           | 0   | 0          | 0      |

**show interface cable sid qos verbose Examples**

Router# **show interface cable 4/0 sid 5 qos verbose**

```

Sid : 5
Traffic Priority : 0
Maximum Sustained Rate : 64000
Maximum Burst : 0
Minimum Reserved Rate : 0
Minimum Packet Size : 0
Maximum Concatenated Burst : 1522
Scheduling Type : Best Effort
Nominal Grant Interval : 0
Tolerated Grant Jitter : 0
Nominal Polling Interval : 0
Tolerated Polling Jitter : 0
Unsolicited Grant Size : 0
Grants per Interval : 0
Request/Transmission Policy : 0x0
IP ToS Overwrite [AND-mask, OR-mask] : 0x0, 0x0
Current Throughput : 0 bits/sec, 0 packets/sec

```

**show interface cable sid counter Examples**

When using DOCSIS 1.1 software, such as Cisco IOS Release 12.2 BC, the **show interface sid counter** command provides the following display:

Router# **show interface cable 5/0 sid counter**

| Sid | Req-polls issued | BW-regs received | Grants issued | Packets received | Frag complete | Concatpkts received |
|-----|------------------|------------------|---------------|------------------|---------------|---------------------|
| 1   | 0                | 22               | 22            | 22               | 0             | 0                   |
| 2   | 0                | 3                | 3             | 2                | 0             | 0                   |
| 3   | 0                | 0                | 0             | 0                | 0             | 0                   |

When using DOCSIS 1.0 software, such as Cisco IOS Release 12.1 EC, the **show interface sid counter** command provides the following display:

Router# **show interface cable 5/0 sid counter**

| Sid | Inpackets | Inoctets | Outpackets | Outoctets | Ratelimit BWReqDrop | Ratelimit DSPktDrop |
|-----|-----------|----------|------------|-----------|---------------------|---------------------|
| 6   | 51        | 6559     | 42         | 3580      | 0                   | 0                   |
| 7   | 47        | 5993     | 40         | 3428      | 0                   | 0                   |
| 8   | 47        | 6136     | 36         | 3122      | 0                   | 0                   |
| 9   | 0         | 0        | 0          | 0         | 0                   | 0                   |

**show interface cable sid counter verbose Examples**

The following example shows typical verbose output for the SID counters on a Cisco uBR-MCxxC cable interface line card:

Router# **show interface cable 4/0 sid 3 counter verbose**

```

Sid : 3
Request polls issued : 0

```

```

BW requests received : 1
No grant buf BW request drops : 0
Rate exceeded BW request drops : 0
Grants issued : 1
Packets received : 0
Bytes received : 0
Fragment reassembly completed : 0
Fragment reassembly incomplete : 0
Concatenated packets received : 0
Queue-indicator bit statistics : 0 set, 0 granted
Good Codewords rx : 0
Corrected Codewords rx : 0
Uncorrectable Codewords rx : 0
Concatenated headers received : 0
Fragmentation headers received : 0
Fragmentation headers discarded: 0

```

The following example shows typical verbose output for the SID counters on the Cisco uBR10-MC5X20S cable interface line card:

Router# **show interface cable 4/0 sid 3 counters verbose**

```

Sid : 1
Request polls issued : 0
BWReqs {Cont,Pigg,RPoll,Other} : 0, 1052, 1052, 0
No grant buf BW request drops : 0
Rate exceeded BW request drops : 0
Grants issued : 1052
Packets received : 0
Bytes received : 0
Fragment reassembly completed : N/A
Fragment reassembly incomplete : N/A
Concatenated packets received : N/A
Queue-indicator bit statistics : 0 set, 0 granted
Good Codewords rx : 53
Corrected Codewords rx : 6110
Uncorrectable Codewords rx : 8540896
Concatenated headers received : 235
Fragmentation headers received : 0
Fragmentation headers discarded: 0

```



#### Note

Because the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR10-MC5X20S/U/H cable interface line cards do not support the fragmentation and concatenation packet counters, these counters always show zero for these particular cable interfaces. However, these interfaces do accurately count the number of concatenation headers, as shown above.

#### show interface cable sid association Example

The following example shows typical output for the **association** keyword:

Router# **show interface cable 5/0 sid association**

| Sid | Prim | Online  | IP Address     | MAC Address    | Interface | VRF Name |
|-----|------|---------|----------------|----------------|-----------|----------|
| 1   |      | online  | 192.168.129.20 | 0003.e38f.e993 | Ca5/0.50  | green    |
| 2   |      | online  | 192.168.129.17 | 0003.e38f.e89d | Ca5/0.50  | green    |
| 3   |      | init(t) | 192.168.129.12 | 00d0.baa2.fb93 | Ca5/0.50  | green    |

The following example shows sample output for the **secondary-ip** keyword:

Router# **show interface cable 5/0 sid secondary-ip**

```

For sid 1 secondary ip list contains 2 address(es)
 192.168.129.20
 192.168.81.123
For sid 2 secondary ip list contains 2 address(es)

```

# show interface cable sid

```
192.168.129.17
10.10.11.3
```



## Tip

One possible situation that might occur is if a CM first assigns a secondary IP address to one CPE device, but later that same IP address is assigned to another CPE device behind a different CM. If this happens, the IP address will continue to show up as a secondary IP address for the original CM until that CM renews its public keys. This will not affect network connectivity for either CPE or CM. You can, however, clear the unneeded secondary IP address from the CMTS database using the **clear cable secondary-ip** command.

Table 228 describes the fields displayed by the **show interface cable sid** command.

**Table 228** *show interface cable sid Field Descriptions*

| Field                          | Description                                                                                                                                                    |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sid                            | Service identification number.                                                                                                                                 |
| Prim Sid                       | The primary service identifier (SID) assigned to the modem.                                                                                                    |
| Type                           | Indicates that this SID was created statically at the time of registration or dynamically by the exchange of dynamic service messages between the CM and CMTS. |
| Online State<br>Offline State  | “Online” means that the modem owning this SID is processing traffic. “Offline” means that the modem owning this SID is not processing traffic.                 |
| Admin Status                   | “Disable” means that the SID has been turned off. “Enable” is the normal state.                                                                                |
| QoS                            | Quality of service.                                                                                                                                            |
| Create time                    | When the SID was created, number of seconds since the system booted.                                                                                           |
| Input octets (In octets)       | Number of octets received by using this SID.                                                                                                                   |
| Input packets (In packets)     | Number of packets received by using this SID.                                                                                                                  |
| Output octets (Out octets)     | Number of octets sent from this SID.                                                                                                                           |
| Output packets (Out packets)   | Number of packets sent from this SID.                                                                                                                          |
| IP address                     | IP address of the modem owning this SID.                                                                                                                       |
| MAC address                    | MAC address of the modem owning this SID.                                                                                                                      |
| BW requests received           | Number of bandwidth requests received by this SID.                                                                                                             |
| Grants issued                  | Number of bandwidth requests granted by this SID.                                                                                                              |
| Rate exceeded BW request drops | Number of bandwidth requests not granted by this SID.                                                                                                          |
| Rate exceeded DS packet drops  | Number of downstream packets lost by this SID.                                                                                                                 |
| Ratelimit BWReqDrop            | Number of bandwidth requests not granted by this SID.                                                                                                          |
| Ratelimit DSPktDrop            | Number of downstream packets lost by this SID.                                                                                                                 |
| 1st time online                | Time at which the modem with this SID connected.                                                                                                               |
| Times online                   | Number of times the modem with this SID connected.                                                                                                             |
| % online                       | Percentage of time the modem with this SID has been connected.                                                                                                 |



**Table 228**      *show interface cable sid Field Descriptions (continued)*

| Field                          | Description                                                                                                                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Online time                    | The minimum, average, and maximum number of hours and minutes the modem with this SID has been connected.<br><br><b>Note</b> A CM is considered online when it has completed the registration process and has communicated with the DHCP, TFTP, and TOD servers.                    |
| Offline time                   | The minimum, average, and maximum number of hours and minutes the modem with this SID has been disconnected.<br><br><b>Note</b> A CM is considered offline after it has missed 16 consecutive station maintenance messages.                                                         |
| MaxSusRate                     | The maximum rate (0 to 4,294,967,295 bps).                                                                                                                                                                                                                                          |
| MinRsvRate                     | The minimum guaranteed rate (0 to 4,294,967,295 bps).                                                                                                                                                                                                                               |
| Sched Type                     | The service class schedule type:<br><br>2–Best-Effort Schedule Type<br>3–Non-Real-Time Polling Service Schedule Type<br>4–Real-Time Polling Service Schedule Type<br>5–Unsolicited Grant Service with Activity Detection Schedule Type<br>6–Unsolicited Grant Service Schedule Type |
| Grant Size                     | The grant size (0 to 65535 bytes).                                                                                                                                                                                                                                                  |
| Grant Interval                 | The grant interval (0 to 4294967295 microseconds).                                                                                                                                                                                                                                  |
| GPI                            | The grants per interval (0 to 127 grants).                                                                                                                                                                                                                                          |
| Poll Interval                  | The poll interval (0 to 4294967295 microseconds).                                                                                                                                                                                                                                   |
| Throughput                     | The overall throughput for this SID.                                                                                                                                                                                                                                                |
| VRF Name                       | Name of the virtual interface that has been configured for Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) operation.                                                                                                                                            |
| Fragment reassembly completed  | Number of packets that were subject to DOCSIS fragmentation that were successfully reassembled.<br><br><b>Note</b> This counter is not supported on the Cisco uBR10-MC5X20 card and always shows 0 or N/A, depending on the software release.                                       |
| Fragment reassembly incomplete | Number of packets that were subject to DOCSIS fragmentation that have not yet been successfully reassembled.<br><br><b>Note</b> This counter is not supported on the Cisco uBR10-MC5X20 card and always shows 0 or N/A, depending on the software release.                          |
| Concatenated packets received  | Number of packets that were subject to DOCSIS concatenation that were successfully received.<br><br><b>Note</b> This counter is not supported on the Cisco uBR10-MC5X20 card and always shows 0 or N/A, depending on the software release.                                          |
| Good Codewords rx              | Number of FEC codewords received without error.                                                                                                                                                                                                                                     |

**Table 228**      *show interface cable sid Field Descriptions (continued)*

| Field                           | Description                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Corrected Codewords rx          | Number of FEC codewords received with errors that could be corrected.                                                                                                                                                              |
| Uncorrectable Codewords rx      | Number of FEC codewords received with errors that could not be corrected.                                                                                                                                                          |
| Concatenated packets received   | Number of concatenation headers received on an upstream service flow. (This field always shows 0 for the Cisco uBR10012 router, but you can use the docsQosUpstreamConcatBursts attribute in DOCS-QOS-MIB to get a current count.) |
| Fragmentation headers received  | Number of fragmentation headers received on an upstream service flow, regardless of whether the fragment was correctly reassembled into a valid packet. (See docsQosUpstreamFragments in DOCS-QOS-MIB.)                            |
| Fragmentation headers discarded | Number of upstream fragments discarded and not assembled into a valid upstream packet. (See docsQosUpstreamFragDiscards in DOCS-QOS-MIB.)                                                                                          |

**Related Commands**

| Command                                    | Description                                                                               |
|--------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>clear cable secondary-ip</b>            | Clears the router's table that links secondary IP addresses to the devices that use them. |
| <b>show cable modem connectivity</b>       | Displays connectivity statistics for one or more CMs.                                     |
| <b>show interface cable signal-quality</b> | Displays information about the cable signal quality.                                      |

# show interface cable signal-quality

To display information about the signal quality of a downstream port on a cable interface line card in a Cisco CMTS, use the **show interface cable signal-quality** command in privileged EXEC mode.

**show interface cable** { *slot/port* | *slot/subslot/port* } **signal-quality** [*n*]

**Cisco IOS Release 12.2(33)SCE and later**

**show interface cable** { *slot/cable-interface-index* | *slot/subslot/cable-interface-index* }  
**signal-quality** [*n*]

| Syntax Description           |                                                                                                                                                           |                                                                                                                                                                                                                                                                                    |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides.                                                                                                                         | <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                         |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                              |                                                                                                                                                                                                                                                                                    |
| <i>port</i>                  | Downstream port number.                                                                                                                                   | <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                             |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. | <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |
| <i>n</i>                     | (Optional) Identifies a particular upstream on the selected interface.                                                                                    |                                                                                                                                                                                                                                                                                    |

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                                                                                                                                                                                                    |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 XA     | This command was introduced.                                                                                                                                                                                    |
|                 | 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

Examples

The following is sample output from the **show interface cable signal-quality** command:

```
CMTS01# show interface cable 6/0 signal-quality
```

```
Cable6/0: Upstream 0 is up includes contention intervals: TRUE
```

[Table 229](#) describes the fields shown in the **show interface cable signal-quality** display.

**Table 229** *show interface cable signal-quality Field Descriptions*

| Field                                        | Description                            |
|----------------------------------------------|----------------------------------------|
| Cable                                        | Interface name.                        |
| Upstream is up includes contention intervals | States whether this statement is true. |



Tip

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

Related Commands

| Command                                | Description                                                             |
|----------------------------------------|-------------------------------------------------------------------------|
| <b>show interface cable downstream</b> | Displays cable interface information.                                   |
| <b>show interface cable sid</b>        | Displays information by SID of each cable access router on the network. |

# show interface cable upstream

To display information about an upstream on a cable interface, use the **show interface cable upstream** command in privileged EXEC mode.

**show interface cable** { *slot/port* | *slot/subslot/port* } **upstream** [*n*] [**ugs statistics** | **rate-adapt**]

**show interface cable** { *slot/port* | *slot/subslot/port* } **upstream** [**bonding-group**]

## Cisco IOS Release 12.2(33)SCE and later releases

**show interface cable** { *slot/cable-interface-index* | *slot/subslot/cable-interface-index* } **upstream** [*n*] [**ugs statistics** | **rate-adapt**]

**show interface cable** { *slot/cable-interface-index* | *slot/subslot/cable-interface-index* } **upstream** [**bonding-group** [*index*]]

| Syntax                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                                                                  |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                                                                |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</li> </ul> |
| <i>n</i>                     | (Optional) Specific upstream to be displayed. Valid values start with 0 for the first upstream port on the cable interface line card.                                                                                                                                                                                                                                                                                                                                                         |
| <b>ugs statistics</b>        | (Optional) Displays statistics related to Unsolicited Grant Service (UGS) flows on the upstream.                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>rate-adapt</b>            | (Optional) Displays whether a specific upstream is enabled or disabled for upstream utilization optimization.                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>bonding-group</b>         | (Optional) Displays the bonding groups configured on an upstream port.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>index</i>                 | (Optional) Bonding group index value. Valid values are from 1 to 65535.                                                                                                                                                                                                                                                                                                                                                                                                                       |

**Command Default** If no upstream is specified, all upstreams on the given cable interface are shown.

**Command Modes** Privileged EXEC (#)

**Command History** This table includes the following release-specific history entries:

- [BC Release](#)
- [C Release](#)
- [SC Release](#)
- [T Release](#)
- [X Release](#)

| BC Release   | Modification                                                                                                                                                                                                    |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(4)BC1   | The MAC-related information in this command was moved to the <b>show interface cable mac-scheduler</b> command for DOCSIS 1.1 operations.                                                                       |
| 12.2(15)BC1a | The <b>ugs statistics</b> keywords were added to Cisco IOS Release 12.2BC.                                                                                                                                      |
| 12.3BC       | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                      |
| 12.3(23)BC2  | The <b>rate-adapt</b> keyword was added.                                                                                                                                                                        |
| C Release    | Modification                                                                                                                                                                                                    |
| 12.1(4)CX1   | The MAC-related information in this command was moved to the <b>show interface cable mac-scheduler</b> command for DOCSIS 1.1 operations.                                                                       |
| SC Release   | Modification                                                                                                                                                                                                    |
| 12.2(33)SCA  | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                              |
| 12.2(33)SCB  | The <b>rate-adapt</b> keyword was integrated into Cisco IOS Release 12.2(33)SCB.                                                                                                                                |
| 12.2(33)SCC  | This command was modified. The <b>bonding-group</b> keyword was added in Cisco IOS Release 12.2(33)SCC.                                                                                                         |
| 12.2(33)SCD2 | This command was modified. The command output was modified to display the multiple transmit channel (MTC) mode cable modems that share a particular upstream channel in their transmit channel set (TCS).       |
| 12.2(33)SCE  | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |
| 12.2(33)SCE5 | This command was modified. The <b>show interface cable upstream</b> command output was modified to display a warning message when no ports are configured on an upstream.                                       |
| 12.2(33)SCG  | This command was modified. The <i>index</i> argument was added to the <b>bonding-group</b> keyword.                                                                                                             |
| T Release    | Modification                                                                                                                                                                                                    |
| 12.0(3)T     | This command was integrated into Cisco IOS Release 12.0(3)T.                                                                                                                                                    |
| X Release    | Modification                                                                                                                                                                                                    |

|           |                              |
|-----------|------------------------------|
| 11.3XA    | This command was introduced. |
| 12.0(7)XR | The output was expanded.     |

## Examples

The following is a sample output of the **show interface cable upstream** command (DOCSIS 1.0 Cisco IOS software releases) for the upstream cable interface located in slot 6 and port 0:

```
Router# show interface cable 6/0 upstream 0

Cable6/0: Upstream 0 is up
Received 855 broadcasts, 147 multicasts, 408833 unicasts
0 discards, 925 errors, 0 unknown protocol
409835 packets input, 20 uncorrectable
884 noise, 0 microreflections
Total Modems On This Upstream Channel : 51 (51 active)
Default MAC scheduler
Queue[Rng Polls] 0/64, fifo queueing, 0 drops
Queue[Cont Mslots] 0/52, fifo queueing, 1 drops
Queue[CIR Grants] 0/64, fair queueing, 0 drops
Queue[BE Grants] 0/64, fair queueing, 0 drops
Queue[Grant Shpr] 0/64, calendar queueing, 0 drops
Reserved slot table currently has 0 CBR entries
Req IEs 8296144, Req/Data IEs 0
Init Mtn IEs 57962, Stn Mtn IEs 14413
Long Grant IEs 133168, Short Grant IEs 67845
Avg upstream channel utilization : 6%
Avg percent contention slots : 89%
Avg percent initial ranging slots : 2%
Avg percent minislots lost on late MAPs : 0%
Total channel bw reserved 0 bps
CIR admission control not enforced
Admission requests rejected 0
Current minislot count : 6788097 Flag: 0
Scheduled minislot count : 6788190 Flag: 0
```

The following is a sample output of the **show interface cable upstream** command (DOCSIS 1.1 Cisco IOS software releases) for the upstream cable interface located in slot 6 and port 0:

```
Router# show interface cable 6/0 upstream 0

Upstream 0 is up
Received 38085 broadcasts, 5758 multicasts, 17257229 unicasts
0 discards, 1451132592 errors, 0 unknown protocol
17301072 packets input, 48239157 uncorrectable
1071719720 noise, 0 microreflections
Total Modems On This Upstream Channel : 147 (142 active)
```

The following is a sample output for the upstream cable interface located for the Cisco uBR10-MC5X20S and Cisco uBR-MC28U/X line cards, which provides information about the error counters maintained by the card onboard MAC controller for each upstream interface:

```
Router# show interface cable 6/1/0 upstream 0

Cable6/1/0: Upstream 3 is up
Received 140 broadcasts, 2075 multicasts, 134502 unicasts
0 discards, 144954 errors, 0 unknown protocol
136717 packets input, 0 uncorrectable
0 noise, 0 microreflections
Total Modems On This Upstream Channel : 37 (35 active)
JIB counters for ifInErrors:
```

**show interface cable upstream**

```

us_error_frame_drop 72477
us_crc_error 4
us_hcs_error 72473
us_cont_collision 0
us_uncorr_cw_rcvd 14

```

The following shows the sample output for the **ugs statistics** option:

```
Router# show interface cable 6/1/0 upstream 3 ugs statistics
```

```

UGS Statistics for Upstream 3
of Active UGS on the Upstream : 4

```

|             | UGS Allocation Statistics |     |     |
|-------------|---------------------------|-----|-----|
|             | max                       | min | avg |
| Last 1 Hour | 14                        | 3   | 4   |
| Last 5 Min  | 12                        | 5   | 5   |

The following shows the sample output for the **rate-adapt** option:

```
Router# show interface cable 6/1/0 upstream 0 rate-adapt
```

```

Global:Enabled US[0]:Enabled rate-adapt_total: 0
local:maps 500 pri 6, rate 150000 bcs 10 (10) fcms Off

```

The following example shows the segment information for upstream ports on cable interface 7/0/1:

```
Router#show interface cable 7/1/0 upstream
```

```

Cable7/1/0: Upstream 0 is up
 Received 1236 broadcasts, 0 multicasts, 312274 unicasts
 0 discards, 37623 errors, 0 unknown protocol
 313510 packets input
 Codewords: 315034 good 82 corrected 1 uncorrectable
 0 noise, 0 microreflections
 Total NON-MTC Modems On This Upstream Channel : 3 (3 active)
 Segments: 0 valid, 0 discarded
Cable7/1/0: Upstream 1 is up
 Received 0 broadcasts, 0 multicasts, 0 unicasts
 0 discards, 0 errors, 0 unknown protocol
 0 packets input
 Codewords: 0 good 0 corrected 0 uncorrectable
 0 noise, 0 microreflections
 Total NON-MTC Modems On This Upstream Channel : 0 (0 active)
 Segments: 0 valid, 0 discarded

```

Beginning in Cisco IOS Release 12.2(33)SCD2, the output of the **show interface cable upstream** command was modified to display the MTC mode cable modems that share a particular upstream channel in their TCS as shown in the following example:

```
Router# show interface cable 7/1/0 upstream 1
```

```

Cable7/1/0: Upstream 1 is up
 Received 1236 broadcasts, 0 multicasts, 312274 unicasts
 0 discards, 37623 errors, 0 unknown protocol
 313510 packets input
 Codewords: 315034 good 82 corrected 1 uncorrectable
 0 noise, 0 microreflections
 Total NON-MTC Modems On This Upstream Channel : 0(0 active)
 Total MTC Modems On This Upstream Channel : 3 (3 active)
 Segments: 0 valid, 0 discarded

```



The following example shows the bonding groups configured for upstream ports on the cable interface 7/0/1:

```
Router# show interface cable 7/1/0 upstream bonding-group
```

```
Cable7/1/0: Upstream Bonding Group 2
 0 packets input, 0 octets input
 Segments: 0 valid, 0 discarded, 0 lost
 Reserved Bandwidth Max : 0 bits/sec
 Reserved Bandwidth : 0 bits/sec
 Available Bandwidth : 2560000 bits/sec
 Total Service Flows On This Bonding Group: 0
Cable7/1/0: Upstream Bonding Group 12
 0 packets input, 0 octets input
 Segments: 0 valid, 0 discarded, 0 lost
 Reserved Bandwidth Max : 0 bits/sec
 Reserved Bandwidth : 0 bits/sec
 Available Bandwidth : 2560000 bits/sec
 Total Service Flows On This Bonding Group: 0
Cable7/1/0: Upstream Bonding Group 235
 0 packets input, 0 octets input
 Segments: 0 valid, 0 discarded, 0 lost
 Reserved Bandwidth Max : 0 bits/sec
 Reserved Bandwidth : 0 bits/sec
 Available Bandwidth : 15360000 bits/sec
 Total Service Flows On This Bonding Group: 0
```

#### Example of show interface cable upstream Command for Cisco IOS Release 12.2(33)SCE5

Starting with Cisco IOS Release 12.2(33)SCE5, the **show interface cable upstream** command output is modified to display a warning message when no ports are configured on an upstream.

The following example displays the output of the **show interface cable upstream** command for upstream 0:

```
Router# show interface cable 7/0/0 upstream 0
```

```
No upstream configured on mac-domain Cable7/0/0
```

The following example displays the output of the **show interface cable upstream** command with **ugs statistics** option:

```
Router# show interface cable 7/0/0 upstream 0 ugs statistics
```

```
No upstream configured on mac-domain Cable7/0/0
```

The following example displays the output of the **show interface cable upstream** command with **rate-adapt** option:

```
Router# show interface cable 7/0/0 upstream 0 rate-adapt
```

```
No upstream configured on mac-domain Cable7/0/0
```

[Table 1](#) describes the significant fields shown in the display.

**Table 230** *show interface cable upstream Field Descriptions*

| Field                                       | Description                                     |
|---------------------------------------------|-------------------------------------------------|
| Cable                                       | Location of the upstream interface.             |
| Upstream is up/<br>...administratively down | Administrative state of the upstream interface. |

**Table 230**      *show interface cable upstream Field Descriptions (continued)*

| Field               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Received broadcasts | Number of broadcast packets received through this upstream interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| multicasts          | Number of multicast packets received through this upstream interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| unicasts            | Number of unicast packets received through this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| discards            | Number of packets discarded by this interface, typically because of buffer overruns.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| errors              | <p>Total of all packets with errors that prevented the transmission of the packets through this upstream interface. This figure could include the following error packets:</p> <ul style="list-style-type: none"> <li>• Collisions of request and request/data packets</li> <li>• Damaged frames received during request and request data requests or slots, typically because they had bad forward error correction (FEC) header checksums (HCS)</li> <li>• Damaged frames received from ranging requests</li> <li>• Data packets with unique word, collision, or no energy</li> <li>• Number of upstream bursts whose preamble or unique word could not be correctly received</li> <li>• Packets with at least one frame with an uncorrectable error</li> </ul> <p>On Broadband Processing Engine (BPE) cable interface line cards, such as the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR10-MC5X20S/U line cards, this counter also counts conditions such as HCS/CRC errors and collisions that occur during initial ranging requests and bandwidth requests. Compare this counter with the uncorrectable error counter from the <b>show cable hop</b> command to determine whether a problem with noise exists, or whether the counter is high only because a large number of CMs are trying to register.</p> |
| unknown protocol    | Number of packets received that were using an unknown protocol (the packet was not an IP, ARP, or PPPoE packet). This counter also includes DOCSIS frames that could not be identified as DOCSIS frames because of malformed headers or invalid header options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| packets input       | Number of frames received (broadcast, multicast, and unicast) through this upstream interface that were free from errors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| corrected           | Number of frames received through this upstream interface that had errors that were corrected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

**Table 230** *show interface cable upstream Field Descriptions (continued)*

| Field                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| uncorrectable                                 | <p>Number of frames received through this upstream interface that had errors that could not be corrected. This means the frame had at least one uncorrectable FEC block, making the whole frame uncorrectable. Nominally, you should expect at most 1 uncorrectable error per 10,000 packets, and typically, the uncorrectable error rate is much less in good environments.</p> <p><b>Note</b> This counter is not supported on Broadband Processing Engine (BPE) cable interface line cards, such as the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR10-MC5X20S/U/H line cards, because these line cards count only uncorrectable codewords, not frames. As a result, this field always shows 0 or N/A for these line cards, depending on the software release. Instead of this field, use the <b>show cable hop</b> command to display the number of uncorrectable errors per codeword.</p> |
| noise                                         | Number of upstream packets of any type that were corrupted by line noise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| microreflections                              | <p>Approximate number of upstream packets corrupted by microreflections. Microreflections are a type of impairment that is caused by impedance mismatches between amplifiers, couples, cables, and other equipment in the cable plant. Microreflections create copies of a signal that arrive at the receiver with different amounts of delay and attenuation, generating intersymbol interference (ISI) that can cause the receiver to improperly detect the amplitude and phase of the incoming signal.</p> <p><b>Note</b> This value is not exact but provides an approximate indication of the microreflections that have been received.</p>                                                                                                                                                                                                                                                      |
| Guaranteed-rate service queue depth           | Number of bandwidth requests queued up in the Guarantee-rate queue. This queue is available only to CMs that have a reserved minimum upstream rate in their class of service (CoS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Best-effort service queue depth               | Number of bandwidth requests queued up in the Best-effort queue. This queue is available to all CMs that do not have any reserved rate on the upstream.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Total Modems On This Upstream Channel         | Number of CMs currently sharing this upstream channel. This field also shows how many of these CMs are active.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Total NON-MTC Modems On This Upstream Channel | Number of non-MTC cable modems currently sharing this upstream channel. This field also shows how many of these CMs are active.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Total MTC Modems On This Upstream Channel     | Number of MTC cable modems currently sharing this upstream channel. This field also shows how many of these CMs are active.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Segments                                      | Valid segments and discarded segments transmitted on a logical channel interface will be added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

**Table 230**      *show interface cable upstream Field Descriptions (continued)*

| Field                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JIB counters for ifInErrors       | <p>Error counters for the upstream interface that are maintained by the MAC controller that is onboard certain cable interface line cards (such as the Cisco uBR10-MC5X20S and Cisco uBR-MC28U/X line cards):</p> <ul style="list-style-type: none"> <li>us_error_frame_drop = Number of frames dropped from the upstream frame queue because the queue was already full with packets with various errors, such as cyclic redundancy check (CRC), header checksum (HCS), fragmentation, concatenation, and unrecognized frame errors.</li> <li>us_crc_error = Number of packets with CRC errors that were received on the upstream.</li> <li>us_hcs_error = Number of packets with HCS errors that were received on the upstream.</li> <li>us_cont_collision = Number of packets that were received with a collision detected during contention transmit opportunity.</li> <li>us_uncorr_cw_rcvd = Number of packets with uncorrectable codewords that were received on the upstream.</li> </ul> |
| Rng Polls                         | MAC scheduler queue showing number of ranging polls.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Cont Mslots                       | MAC scheduler queue showing number of forced contention request slots in MAP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| CIR Grants                        | MAC scheduler queue showing number of CIR grants pending.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| BE Grants                         | MAC scheduler queue showing number of Best-Effort grants pending.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Grant Shpr                        | MAC scheduler queue showing number of grants buffered for traffic shaping.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Reserved slot table               | Number of slots that the MAC scheduler has placed in the reserved slot table at the time that the command was made.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Req IEs                           | Counter of Request IEs sent in MAP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Req/Data IEs                      | Counter of Request/Data IEs sent in MAP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Init Mtn IEs                      | Counter of Initial Maintenance IEs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Stn Mtn IEs                       | Number of station maintenance (ranging poll) IEs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Long Grant IEs                    | Number of long grant IEs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ShortGrmg IEs                     | Number of short grant IEs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Avg upstream channel utilization  | Average percent of the upstream channel bandwidth being used for user (Ethernet) traffic. This does not include DOCSIS MAC-layer packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Avg percent contention slots      | Average percent of slots available for CMs to request bandwidth using contention mechanisms. Also indicates the amount of unused capacity in the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Avg percent initial ranging slots | Average percent of slots in the initial ranging state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Table 230** *show interface cable upstream Field Descriptions (continued)*

| Field                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Avg percent minislots lost on late MAP    | Average percent of slots that were lost because a MAP interrupt was too late.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Current Total Bandwidth Reserved          | Total amount of bandwidth reserved by all CMs sharing this upstream channel that require bandwidth reservation. The CoS for these CMs specifies some nonzero value for the guaranteed-upstream rate. When one of these CMs is admitted on the upstream, this field value is incremented by this guaranteed-upstream rate value.                                                                                                                                                                                                                    |
| CIR admission control                     | Status of admission control on the upstream channel.<br><br>ENFORCED status allows users to enable admission control on a per-port basis. This controls how limited bandwidth is allocated. NOT ENFORCED status indicates that there is no admission control. Every modem that registers with a class of service (COS) specifying a minimum upstream rate is admitted by the CMTS, regardless of how much aggregate bandwidth is actually available.<br><br>Users enable admission control via the admission control command-line interface (CLI). |
| Subscription Level                        | Amount of oversubscription to allow on this upstream channel, as configured with the <b>cable upstream admission-control</b> command. Oversubscription is expressed as a percentage of the raw capacity of the channel.                                                                                                                                                                                                                                                                                                                            |
| Reservation Limit (with Oversubscription) | Maximum cumulative bandwidth reservation allowable before rejecting new CMs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Admission requests rejected               | Number of CMs that attempted to register on this interface but were rejected because of the admission control policy that has been configured with the <b>cable upstream admission-control</b> command.                                                                                                                                                                                                                                                                                                                                            |
| Virtual channel bw                        | Maximum virtual bandwidth of this capacity, in bits per second (b/s), when admission control is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Last Minislot Stamp (current_time_base)   | Current minislot count at the CMTS. FLAG indicates the timebase reference. This field is used only by developers.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Last Minislot Stamp (scheduler_time_base) | Furthest minislot count allocated at the indicated time. FLAG indicates the timebase reference. This field is used by developers.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| # of Active UGS on the Upstream           | Number of Unsolicited Grant Service (UGS) flows that are currently active on the upstream.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Table 230** *show interface cable upstream Field Descriptions (continued)*

| Field                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UGS Allocation Statistics (max, min, avg) | Maximum number of UGS service flows, minimum number of UGS service flows, and average number of UGS service flows that have been allocated on the upstream over the last hour and last five minute period.                                                                                                                                                                                                                                            |
| Rate-adapt                                | Rate-adapt is enabled and any local upstream (US) configuration information: <ul style="list-style-type: none"> <li>• global—Rate-adapt is enabled globally.</li> <li>• US—Rate-adapt is enabled locally on a specific US.</li> <li>• pri—Indicates the priority setting for the local US.</li> <li>• rate—Indicates the minimum max-rate setting for the local US.</li> <li>• bcs—Indicates the number of broadcast contention minislots.</li> </ul> |

Table 2 describes the significant fields shown in the display:

**Table 231** *show interface cable upstream bonding-group Field Descriptions*

| Field                                     | Description                                                                                    |
|-------------------------------------------|------------------------------------------------------------------------------------------------|
| packets input                             | Number of drops, errors, and total number of packets received on each upstream.                |
| octets input                              | Number of octets received on the upstream.                                                     |
| Segments                                  | Number of valid segments, discarded segments and lost segments transmitted on a bonding group. |
| Reserved Bandwidth Max                    | Maximum amount of bandwidth reserved for a bonding group.                                      |
| Reserved Bandwidth                        | Amount of bandwidth reserved by all CMs sharing this upstream channel.                         |
| Available Bandwidth                       | Amount of bandwidth available on a bonding group.                                              |
| Total Service Flows on this Bonding Group | Number of service flows assigned to a particular bonding group.                                |

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a time stamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

The following is a sample output of the **show interface cable upstream bonding-group** command showing bonding group 2 configuration on the cable interface 7/0/1 in Cisco IOS Release 12.2(33)SCG:

```
Router# show interface cable 7/1/0 upstream bonding-group 2
```

```
30 seconds input rate 515470 bits/sec, 1000 packets/sec.
```

**Related Commands**

| Command                                    | Description                                                                          |
|--------------------------------------------|--------------------------------------------------------------------------------------|
| <b>show interface cable</b>                | Displays configuration and status information for the cable interface.               |
| <b>show interface cable downstream</b>     | Displays information about the downstream cable interface.                           |
| <b>show interface cable sid</b>            | Displays information by service identifier (SID) of each cable modem on the network. |
| <b>show interface cable signal-quality</b> | Displays information about the cable signal quality.                                 |

# show interface cable upstream debug

To display information about the Service ID (SID) tracking on a cable interface, use the **show interface cable upstream debug** command in privileged EXEC mode.

```
show interface cable slot/subslot/port upstream debug sid-tracking sid-value start-index
count-number {summary | verbose}
```

```
show interface cable slot/subslot/port upstream debug sid-tracking sid-value clear
```

Cisco IOS Release 12.2(33)SCE and later

```
show interface cable slot/subslot/cable-interface-index upstream debug sid-tracking sid-value
start-index count-number {summary | verbose}
```

```
show interface cable slot/subslot/cable-interface-index upstream debug sid-tracking sid-value
clear
```

| Syntax Description                   |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                          | Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul>                                                                                                                                                                       |
| <i>subslot</i>                       | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| <i>port</i>                          | Downstream port number. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                                                                                                                                                   |
| <i>cable-interface-index</i>         | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards. <p>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.</p> <p>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14.</p> |
| <b>sid-tracking</b> <i>sid-value</i> | Specifies the SID number for which SID tracking details are displayed. The valid range is from 1 to 8191.                                                                                                                                                                                                                                                                                                                                    |
| <i>start-index</i>                   | First event you want to display. Valid values are from 0 to 40000.                                                                                                                                                                                                                                                                                                                                                                           |
| <i>count-number</i>                  | Total number of events you want to display. Valid values are from 0 to 40000.                                                                                                                                                                                                                                                                                                                                                                |
| <b>summary</b>                       | (Optional) Displays the summary of events.                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>verbose</b>                       | (Optional) Displays queuing and token bucket information for bandwidth requests.                                                                                                                                                                                                                                                                                                                                                             |
| <b>clear</b>                         | Clears the SID tracking data.                                                                                                                                                                                                                                                                                                                                                                                                                |



**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                                                    |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC.                                                                                                                                                   |
|                 | 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

### Examples

The following is a sample output of the **show interface cable upstream debug** command on a cable interface line card in slot 5, subslot 0, and port 1:

```
router# show cable 5/0/1 upstream debug sid-tracking 35 0 40000
```

```
[19]:BWREQ_2 2662273505 4594-usecs bytes:2987 req_id:0 sid:35
[63]:BWREQ_2 2662361817 4905-usecs bytes:2987 req_id:0 sid:35
[108]:BWREQ_2 2662450105 5190-usecs bytes:2987 req_id:0 sid:35
[151]:BWREQ_2 2662535807 4893-usecs bytes:2987 req_id:0 sid:35
[196]:BWREQ_2 2662624956 4043-usecs bytes:2987 req_id:0 sid:35
[240]:BWREQ_2 2662713320 4407-usecs bytes:2987 req_id:0 sid:35
[284]:BWREQ_2 2662801603 4682-usecs bytes:2987 req_id:0 sid:35
[328]:BWREQ_2 2662889928 5006-usecs bytes:2987 req_id:0 sid:35
[373]:BWREQ_2 2662978229 5304-usecs bytes:2987 req_id:0 sid:35
[417]:BWREQ_2 2663067305 4381-usecs bytes:2987 req_id:0 sid:35
[461]:BWREQ_2 2663155618 4694-usecs bytes:2987 req_id:0 sid:35
[505]:BWREQ_2 2663243945 5020-usecs bytes:2987 req_id:0 sid:35
```

| Related Commands | Command                      | Description                                                                                                                                         |
|------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>debug cable interface</b> | Displays debugging messages for a specific cable interface, or for traffic related to a specific MAC address or Service ID on that cable interface. |
|                  | <b>show interface cable</b>  | Displays configuration and status information for the cable interface.                                                                              |

# show interface gigabitethernet

To display status of the gigabitethernet interface, its MAC and IP address details, and information about the Downstream External PHY Interface (DEPI) traffic, use the **show interface gigabitethernet** command in privilege EXEC mode.

```
show interface gigabitethernet slot/subslot/{bay | port}
```

| Syntax Description |                                                                                            |                                                                                                                                                                                                                                                                                                                                                                |
|--------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>        | The slot where a SIP or cable line card resides.                                           | <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>• Cisco uBR10012 router—The valid range for: <ul style="list-style-type: none"> <li>– Cable line card is from 5 to 8</li> <li>– SIP is 1 and 3</li> </ul> </li> </ul>             |
| <i>subslot</i>     | The subslot where a SIP or cable line card resides.                                        | <ul style="list-style-type: none"> <li>• Cisco uBR10012 router—The valid value for: <ul style="list-style-type: none"> <li>– Cable line card in slot 5 to 8 is 0 or 1</li> <li>– SPAs in a SIP in slot 1 or 3, prior to Cisco IOS Release 12.2(33)SCB is 0 or 1. For Cisco IOS Release 12.2(33)SCB and later, subslot is not specified.</li> </ul> </li> </ul> |
| <i>bay</i>         | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay). |                                                                                                                                                                                                                                                                                                                                                                |
| <i>port</i>        | Specifies the port number.                                                                 | <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router and Cisco uBR7225VXR router—The valid range is from 0 to 1.</li> <li>• Cisco uBR10012 router—The valid value for: <ul style="list-style-type: none"> <li>– Slot 1 and 3 is 0</li> <li>– Slot 5 to 8 is from 0 to 4</li> </ul> </li> </ul>                                                     |

|                 |       |
|-----------------|-------|
| Command Default | None. |
|-----------------|-------|

|               |                |
|---------------|----------------|
| Command Modes | Privilege EXEC |
|---------------|----------------|

| Command History | Release     | Modification                                                                                                                  |
|-----------------|-------------|-------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCE | This command was introduced.                                                                                                  |
|                 | 12.2(33)SCG | This command was modified. The status of the output flow-control and input flow-control in the output is displayed correctly. |

**Examples**

This is a sample output for the **show interface gigabitethernet** command:

```
Router# show interface gigabitethernet 6/1/0
GigabitEthernet6/1/0 is up, line protocol is up
Hardware is Gigabit Ethernet MAC Controller, address is 0013.5f06.7f74 (bia
0013.5f06.7f74)
Internet address is 56.1.1.1/24
MTU 1500 bytes, BW 10000 Kbit, DLY 10 usec,
 reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive not set
Full Duplex, 1000Mbps, link type is auto, media type is SX
output flow-control is unsupported, input flow-control is unsupported
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:01, output 00:00:00, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 8
Interface GigabitEthernet6/1/0 queueing strategy: PXF Class-based
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
 2557 packets input, 541995 bytes, 0 no buffer
 Received 0 broadcasts (0 IP multicasts)
 0 runs, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
 0 watchdog, 0 multicast, 0 pause input
 723 packets output, 52113 bytes, 0 underruns
 0 output errors, 0 collisions, 1 interface resets
 0 babbles, 0 late collision, 0 deferred
 0 lost carrier, 0 no carrier, 0 pause output
 0 output buffer failures, 0 output buffers swapped out
Router#
```

Starting from Cisco IOS Release 12.2(33)SCG, the **show interface gigabitethernet** command was modified to display the correct status of the output and input flow-control parameters. This change is applicable only to Cisco SPA-5X1G and Cisco SPA-1X10G shared port adapters.

The following example shows the changed output of the **show interface gigabitethernet** command:

```
Router# show interface gigabitethernet1/2/3
Load for five secs: 5%/0%; one minute: 8%; five minutes: 8%
Time source is NTP, 14:25:51.761 CST Wed Feb 20 2013
GigabitEthernet1/2/3 is down, line protocol is down
Hardware is GigEther SPA, address is 649e.f366.b71d (bia 649e.f366.b71d)
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
 reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Full Duplex, 1000Mbps, link type is auto, media type is LX
output flow-control is on, input flow-control is on
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Interface GigabitEthernet1/2/3 queueing strategy: PXF Class-based
30 second input rate 0 bits/sec, 0 packets/sec
30 second output rate 0 bits/sec, 0 packets/sec
 0 packets input, 0 bytes, 0 no buffer
 Received 0 broadcasts (0 IP multicasts)
 0 runs, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
 0 watchdog, 0 multicast, 0 pause input
 0 packets output, 0 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
```

show interface gigabitethernet

```
0 babbles, 0 late collision, 0 deferred
0 lost carrier, 0 no carrier, 0 pause output
0 output buffer failures, 0 output buffers swapped out
Router#
```

| Related Commands | Command                         | Description                                                                 |
|------------------|---------------------------------|-----------------------------------------------------------------------------|
|                  | show controller gigabitethernet | Displays information about the Gigabit Ethernet interface used by the DEPI. |

# show interface integrated-cable

To display the current configuration and status for an integrated channel, use the **show interface integrated-cable** command in privileged EXEC mode.

**Cisco uBR10012 Router**

**show interface integrated-cable** *slot/subslot/port: interface-number* [*options*]

**Cisco uBR7246VXR and Cisco uBR7225VXR Routers**

**show interface integrated-cable** *slot/port: interface-number* [*options*]

| Syntax Description | <i>slot/subslot/port</i> | <ul style="list-style-type: none"><li><i>slot</i>—Slot where the line card resides. The valid range is from 5 to 8.</li><li><i>subslot</i>—Subslot where the line card resides. The available slots are 0 or 1.</li><li><i>port</i>—Downstream controller number on the line card. The valid <i>port</i> values are 0 to 4.</li></ul>                                                                                     |
|--------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>slot/port</i>         | On the Cisco uBR7225VXR or Cisco uBR7246VXR routers: <ul style="list-style-type: none"><li><i>slot</i>—Slot where the line card resides.<ul style="list-style-type: none"><li>Cisco uBR7225VXR router—The valid range is from 1 to 2.</li><li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li></ul></li><li><i>port</i>—Downstream controller number on the line card. The valid values are 0 or 1.</li></ul> |
|                    | <i>interface-number</i>  | Integrated cable interface number. The valid range is from 0 to 3.                                                                                                                                                                                                                                                                                                                                                        |

---

*options*

The following non-cable specific options generate information for integrated cable interfaces:

- **accounting**—Displays the number of packets of each protocol type that is sent through the interface.
  - **controller**—Displays the status of the interface, configuration, and controller.
  - **counters**—Displays the integrated cable interface counters.
  - **crb**—Displays the interface routing and bridging information.
  - **db**s—Displays the Dynamic Bandwidth Sharing (DBS) scheduler information.
  - **description**—Displays the description entered for the interface.
  - **d**lm—Displays the DEPI Latency Measurement (DLM) statistics.
  - **downstream**—Displays the downstream information.
  - **fair-queue**—Displays the integrated cable interface Weighted Fair Queuing (WFQ) information.
  - **irb**—Displays the interface routing and bridging information.
  - **mac-accounting**—Displays the interface MAC accounting information.
  - **monitor**—Displays the status of the interface continuously.
  - **m**pls-exp—Displays the interface Multiprotocol Label Switching (MPLS) experimental accounting information.
  - **multicast-gcr**—Displays the multicast QoS (MQoS) GCR details.
  - **multicast-sessions**—Displays information about the multicast sessions on the integrated-cable interface.
  - **precedence**—Displays interface precedence accounting information.
  - **privacy**—Displays privacy group information.
  - **random-detect**—Displays the interface Weighted Random Early Detection (WRED) information.
  - **stats**—Displays packets that are switched.
  - **summary**—Displays interface summary information.
  - **switching**—Displays interface switching information.
- 

---

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                            |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced on the Cisco uBR10012 router.                                                                               |
| 12.2(33)SCD | This command was integrated on the Cisco uBR7246VXR and Cisco uBR7225VXR routers.                                                       |
| 12.2(33)SCF | This command was modified. The <b>downstream</b> keyword was enhanced to capture fairness across DOCSIS interfaces related information. |

**Usage Guidelines**

Some other non-cable specific options do not generate any meaningful information for integrated-cable interfaces. For information on the non-cable specific options, see the Cisco IOS Release 12.3 documentation on [Cisco.com](http://Cisco.com).

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to the **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Examples**

The following is a sample output of the **show interface integrated-cable accounting** command:

```
Router# show interface integrated-cable 7/0/0:0 accounting
```

| Protocol | Pkts In | Chars In | Pkts Out | Chars Out |
|----------|---------|----------|----------|-----------|
| IP       | 0       | 0        | 280      | 41606     |

The following is a sample output of the **show interface integrated-cable dbs** command:

```
Router# show interface integrated-cable 3/0:0 dbs
```

```
Dynamic Bandwidth Sharing is enabled
active 0
RF 0: tokens 23342, active 0, policer 4687 KB/s, max_tokens 23435
 deficit counter 0, quantum 6000
 ticks_limit: 62500, max_ticks:625000, policer(ticks): 312
```

The following is the sample output of the **show interface integrated-cable description** command:

```
Router# show interface integrated-cable 7/0/0:0 description
```

```
Interface Status Protocol Description
In7/0/0:0 up up
tfchan_ubr10k_1#show interface integrated-cable 7/0/0:0 downstream
In7/0/0:0: Downstream is up
 Total Modems 5 (5 active), Total Flows 6
 Total downstream bandwidth: 18750 Kbps
 Total downstream reserved/reservable bandwidth: 2002/15000 Kbps
```

The following is the sample output of the **show interface integrated-cable downstream** command:

```
Router# show interface integrated-cable 7/0/0:0 downstream
```

```
In7/0/0:0: Downstream is up
 Total Modems 5 (5 active), Total Flows 6
 Total downstream bandwidth: 18750 Kbps
 Total downstream reserved/reservable bandwidth: 2002/15000 Kbps
```

The following is the sample output of the **show interface integrated-cable irb** command:

## show interface integrated-cable

```
Router# show interface integrated-cable 7/0/0:0 irb
```

```
Integrated-Cable7/0/0:0
tfchan_ubr10k_1#show interface integrated-cable 7/0/0:0 multicast-gcr
Group Classifier Rules on Integrated-Cable7/0/0:0:
Classifier_id Group_id Group_Qos_id Sid SFID ref_count Key
1 1 1 8196 16 1 0
```

The following is a sample output of the **show interface integrated-cable multicast-gcr** command:

```
Router# show interface integrated-cable 5/1/2:0 multicast-gcr
```

```
Group Classifier Rules on Integrated-Cable7/0/0:0:
Classifier_id Group_id Group_Qos_id Sid SFID ref_count Key
1 1 1 8196 16 1 0
```

The following is a sample output of the **show interface integrated-cable multicast-sessions** command:

```
Router# show interface integrated-cable 5/1/2:0 multicast-sessions
```

```
Default Multicast Service Flow 53 on Integrated-Cable 5/1/2:0
Multicast Group : 230.1.2.3
Source : N/A
Act GCRs : 2
Interface : Bu123 State: A GI: Bu123 RC: 0

GCR : GC SAID SFID Key GQC GEn
 2 8252 64 31 2 1
 1 8253 65 32 1 1
```

### Example of the Updated show interface integrated-cable downstream Command Output in Cisco IOS Release 12.2(33)SCF

The following is a sample output of the **show interface integrated-cable downstream** command:

```
Router# show interface integrated-cable 6/1/0:0 downstream
```

```
In6/1/0:0: Downstream is up
Total Modems 1 (1 active), Total Flows 2
Total downstream bandwidth: 375 Kbps
Total downstream reserved/reservable bandwidth: 0/300 Kbps
Total downstream guaranteed/non-guaranteed bonus bandwidth: 20025/10012 Kbps
```

## Related Commands

| Command                                      | Description                                                                                                        |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>show interface integrated-cable queue</b> | Displays the downstream hierarchical queueing framework (HQF) queue information for an integrated cable interface. |



# show interface integrated-cable queue

To display the downstream hierarchical queueing framework (HQF) queue information for an integrated cable interface, use the **show interface integrated-cable queue** command in privileged EXEC mode.

**show interface integrated-cable** *slot/port:sub-interface* **queue** [**verbose** | **cblt** [*cblt\_index* | *priority*] | **pblt**]

| Syntax Description |                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot/port</i>   | <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> </ul> </li> <li><i>port</i>—Downstream controller number on the line card. The valid <i>port</i> values are 0 or 1.</li> </ul> |
| <b>verbose</b>     | (Optional) Displays detailed information for all queues                                                                                                                                                                                                                                                                                                                                  |
| <b>cblt</b>        | (Optional) Displays detailed class layer bandwidth limited traffic (CBLT) stream information for normal downstream HQF queues.                                                                                                                                                                                                                                                           |
| <i>cblt_index</i>  | CBLT index information.                                                                                                                                                                                                                                                                                                                                                                  |
| <i>priority</i>    | Displays CBLT information for priority HQF queues. Priority queues do not have any indexes.                                                                                                                                                                                                                                                                                              |
| <b>pblt</b>        | (Optional) Displays detailed physical layer bandwidth limited traffic (PBLT) stream information for this interface.                                                                                                                                                                                                                                                                      |

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                                                                       |
|-----------------|-------------|------------------------------------------------------------------------------------|
|                 | 12.2(33)SCD | This command was introduced for the Cisco uBR7246VXR and Cisco uBR7225VXR routers. |

**Examples** The following is a sample output of the **show interface integrated-cable queue** command:

```
Router> show interface integrated-cable 3/0:0 queue
```

```

* idx/gqid Len/Limit Deqs Drops CIR MIR/PR SFID ForwInt
 pkts pkts pkts kbps kbps
BE Queues:
I 0/1 0/128 700 0 0 0/0 C5/0:11
In5/0:0
 1/44 0/128 0 0 0 10000/0 C5/0:11
In5/0:0

CIR Queues:
 33/97 0/128 1 14374 0 100 15000/0 C5/0:15
In5/0:0

Low Latency Queues:
```

# show interface integrated-cable queue

```

~ 51/124 0/128 1 14374 0 100 100/0 C5/0:15
In5/0:0
$ 0/0 0/128 1 14374 0 100 100/0 -
In5/0:0
I: Cable Interface Queue
$: Low Latency Queue
~: Low Latency Policing Queue

```

Router>

The following is a sample output of the **show interface integrated-cable queue verbose** command:

Router> **show interface integrated-cable 3/0:0 queue verbose**

Interface Number 5 (type 25) Integrated Cable 3/0:0

OUTPUT FEATURES

```

blt (0x63D90FA0, index 0, qid 0, fast_if_number 5) layer PHYSICAL
scheduling policy: WFQ (111)
classification policy: CLASS_BASED (122)
drop policy: TAIL (141)
packet size fixup policy: NONE (0) no of global policers: 0
blt flags: 0x220000 scheduler: 0x63DFDBE0
total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 0 total
active 0

txcount 26131 txqbytes 2030784 drops 0 qdrops 0 nobuffers 0 flowdrops 0
qsize 0 aggregate limit/bytes 1000/0 availbuffers 1000
holdqueue_out 1000 perc 0.00 remaining_ratio/perc 0
visible_bw 37500 max_rate 37500 allocated_bw 37500 vc_encap 0 ecn_threshold NONE
weight A 1 quantum A 1500 credit A 1500
weight B 1 quantum B 1500 credit B 1500
min-rate tokens: 13000, credit: 0, depth: 13000

backpressure_policy 0 scheduler_flags C03B
last_sortq[A/B] 0/0, remaining pak/particles 0/0
leaf_blt[P1] 0x63DFDBE0 burst packets/bytes[P1] 0/0
leaf_blt[P2] 0x63DFDBE0 burst packets/bytes[P2] 0/0
leaf_blt[NOTP] 0x63DFDBE0 burst packets/bytes[NOTP] 0/0
(max entries 1000)

next layer HQFLAYER_CLASS_HIERO (max entries 1000)

blt (0x63D90EE0, index 0, qid 1, fast_if_number 5) layer CLASS_HIERO
scheduling policy: FIFO (110)
classification policy: NONE (120)
drop policy: TAIL (141)
packet size fixup policy: NONE (0) no of global policers: 0
blt flags: 0x220000 scheduler: 0x63DFDB20
total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 0 total
active 1

txcount 167 txqbytes 12912 drops 0 qdrops 0 nobuffers 0 flowdrops 0
qsize 0 aggregate limit/bytes 1000/0 availbuffers 1000
holdqueue_out 0 perc 100.00 remaining_ratio/perc 0
visible_bw 37500 max_rate 37500 allocated_bw 37500 vc_encap 0 ecn_threshold NONE
weight A 1 quantum A 1500 credit A 1500
weight B 1 quantum B 1500 credit B 1500
min-rate tokens: 18750, credit: 0, depth: 18750

backpressure_policy 0 scheduler_flags C03B
last_sortq[A/B] 55/11, remaining pak/particles 0/0

```

```
leaf_blt[P1] 0x63DFDB20 burst packets/bytes[P1] 0/0
leaf_blt[P2] 0x63DFDB20 burst packets/bytes[P2] 0/0
leaf_blt[NOTP] 0x63DFDB20 burst packets/bytes[NOTP] 1/80
```

Router>

The following is a sample output of the **show interface integrated-cable queue cblt *cblt\_index*** command:

Router> **show interface integrated-cable 3/0:0 queue cblt 1**

```
blt (0x65CE3EA0, index 1, qid 45, fast_if_number 19) layer CLASS_HIER0
scheduling policy: FIFO (110)
classification policy: NONE (120)
drop policy: TAIL (141)
packet size fixup policy: NONE (0) no of global policers: 0
D/Traffic Shaping enabled
blt flags: 0x22A208C scheduler: 0x65D504C0
total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 1000 total
active 1
D/Traffic Shaping enabled
txcount 890 txqbytes 63900 drops 0 qdrops 0 nobuffers 0 flowdrops 0
qsize 0 aggregate limit/bytes 128/100000 availbuffers 128
holdqueue_out 0 perc 0.00 remaining_ratio/perc 11
visible_bw 0 max_rate 4000 allocated_bw 0 vc_encap 0 ecn_threshold NONE
weight A 1 quantum A 1500 credit A 1500
weight B 1 quantum B 1500 credit B 1500
min-rate tokens: 1500, credit: 0, depth: 1500

backpressure_policy 0 scheduler_flags C03F
last_sortq[A/B] 0/0, remaining pak/particles 0/0
leaf_blt[P1] 0x65D504C0 burst packets/bytes[P1] 0/0
leaf_blt[P2] 0x65D504C0 burst packets/bytes[P2] 0/0
leaf_blt[NOTP] 0x65D504C0 burst packets/bytes[NOTP] 0/0

OUTPUT Shaping
Bc internal 0 Be internal 0 Time interval 4
increment 4000 increment_lower 0 increment_limit 4000
last visit 87456736 credit 0 outstanding_tokens 23760 maxtokens 24352
peak_rate_credit 0 peak_rate_tokens 0 peak_rate_increment 0
system timer delayed 0 restart timer 0
timer set 0 hqf_shape_running 17254
nextexpire_system_time 0 nextexpire_time_qindex -1

Router>
```

The following is a sample output of the **show interface integrated-cable queue cblt *priority*** command:

Router# **show interface integrated-cable 3/0:0 queue cblt priority**

```
blt (0x19FA9300, index 0, qid 52, fast_if_number 20) layer CLASS_HIER0
scheduling policy: FIFO (110)
classification policy: NONE (120)
drop policy: TAIL (141)
packet size fixup policy: NONE (0) no of global policers: 0
blt flags: 0x200800 scheduler: 0x1A015CC0
total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 9500 total
active 1

txcount 114 txqbytes 12864 drops 0 qdrops 0 nobuffers 0 flowdrops 0
qsize 0 aggregate limit/bytes 128/0 availbuffers 128
holdqueue_out 0 perc 0.00 remaining_ratio/perc 0
visible_bw 0 max_rate 37500 allocated_bw 0 vc_encap 0 ecn_threshold NONE
```

**show interface integrated-cable queue**

```

weight A 1 quantum A 1500 credit A 1500
weight B 1 quantum B 1500 credit B 1500
min-rate tokens: 1500, credit: 0, depth: 1500

backpressure_policy 0 scheduler_flags C83F
last_sortq[A/B] 0/0, remaining pak/particles 0/0
leaf_blt[P1] 0x1A015CC0 burst packets/bytes[P1] 0/0
leaf_blt[P2] 0x1A015CC0 burst packets/bytes[P2] 0/0
leaf_blt[NOTP] 0x1A015CC0 burst packets/bytes[NOTP] 0/0

PRIORITY LEVEL 1: total bandwidth 500 kbps, total percent 0%

Router#

```

The following is a sample output of the **show interface integrated-cable queue pblt** command:

```

Router# show interface integrated-cable 3/0:0 queue pblt

blt (0x19FB4700, index 0, qid 0, fast_if_number 20) layer PHYSICAL
scheduling policy: WFQ (111)
classification policy: CLASS_BASED (122)
drop policy: TAIL (141)
packet size fixup policy: NONE (0) no of global policers: 0
blt flags: 0x220000 scheduler: 0x1A0210C0
total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 0 total
active 0

txcount 67743 txqbytes 6281007 drops 2 qdrops 0 nobuffers 0 flowdrops 0
qsize 0 aggregate limit/bytes 8000/0 availbuffers 8000
holdqueue_out 1000 perc 0.00 remaining_ratio/perc 0
visible_bw 37500 max_rate 37500 allocated_bw 18000 vc_encap 0 ecn_threshold NONE
weight A 1 quantum A 1500 credit A 1500
weight B 1 quantum B 1500 credit B 1500
min-rate tokens: 13000, credit: 0, depth: 13000

backpressure_policy 1 scheduler_flags C03F
last_sortq[A/B] 0/0, remaining pak/particles 0/0
leaf_blt[P1] 0x1A0210C0 burst packets/bytes[P1] 0/0
leaf_blt[P2] 0x1A0210C0 burst packets/bytes[P2] 0/0
leaf_blt[NOTP] 0x1A0210C0 burst packets/bytes[NOTP] 0/0

Router#

```

[Table 232](#) describes the fields shown in the **show interface integrated-cable** command display.

**Table 232** *show interface integrated-cable – Field Description*

| Field          | Description                                                 |
|----------------|-------------------------------------------------------------|
| Len/Limit Pkts | Queue length and limit in packets.                          |
| Deqs Pkts      | Dequeue packets                                             |
| Drops Pkts     | Dropped packets.                                            |
| CIR Kbps       | Committed information rate, in kilobytes per second.        |
| MIR/PR Kbps    | Maximum information and peak rate, in kilobytes per second. |
| Forwint        | Forwarding interface.                                       |
| BE Queues      | Best effort queues.                                         |

**Table 232** *show interface integrated-cable – Field Description (continued)*

| Field              | Description                         |
|--------------------|-------------------------------------|
| CIR Queues         | Committed information rate queues.  |
| Low Latency Queues | Low latency queues.                 |
| sfid               | Service flow identification number. |

**Related Commands**

| Command                                    | Description                                                                  |
|--------------------------------------------|------------------------------------------------------------------------------|
| <b>show interface cable downstream</b>     | Displays information about the downstream on the cable interface.            |
| <b>show interface cable sid</b>            | Displays the service identifier (SID) information of each CM on the network. |
| <b>show interface cable signal-quality</b> | Displays information about the cable signal quality.                         |
| <b>show interface cable upstream</b>       | Displays information about one or all upstreams on the cable interface.      |
| <b>show interface wideband-cable</b>       | Displays information about wideband channels.                                |

# show interface modular-cable

To display the current configuration and status of a modular cable interface, use the **show interface modular-cable** command in privileged EXEC mode.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**show interface modular-cable** *slot/subslot/bay:nb-channel-number*

## Cisco IOS Release 12.2(33)SCB

**show interface modular-cable** *slot/bay/port:nb-channel-number*

## Cisco IOS Release 12.2(33)SCF

**show interface modular-cable** *slot/subslot/port:nb-channel-number*

| Syntax Description       |  |                                                                                             |
|--------------------------|--|---------------------------------------------------------------------------------------------|
| <i>slot</i>              |  | Slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
| <i>subslot</i>           |  | Subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.   |
| <i>bay</i>               |  | Bay in a SIP where a SPA is located. The valid values are 0 (upper bay) and 1 (lower bay).  |
| <i>port</i>              |  | Interface number on the SPA.                                                                |
| <i>unit</i>              |  | Controller unit number.                                                                     |
| <i>nb-channel-number</i> |  | Narrowband channel number.                                                                  |

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                                                                                                                                                                                                   |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(23)BC  | This command was introduced.                                                                                                                                                                                   |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |
|                 | 12.2(33)SCF | This command was modified. The <b>downstream</b> keyword was enhanced to capture fairness across DOCSIS interfaces related information.                                                                        |

## Examples

The following is sample output of the **show interface modular-cable** command:

```
Router# show interface modular-cable 1/0/0:0

Modular-Cable3/0/0:0 is up, line protocol is up
 Hardware is CMTS MC interface, address is 0011.9221.84be (bia 0011.9221.84be)
 MTU 1500 bytes, BW 539 Kbit, DLY 1000 usec,
 reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation MCNS, loopback not set
```

```

Keepalive set (10 sec)
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, output 00:09:57, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: PXF First-In-First-Out
Output queue 0/64, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
 0 packets input, 0 bytes, 0 no buffer
 Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 107 packets output, 16302 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 output buffer failures, 0 output buffers swapped out

```

The following is sample output of the **show interface modular-cable** command with **downstream** keyword:

```
Router# show interface modular-cable 1/0/0:1 downstream
```

```

Mol/0/0:1: Downstream is up
Total Modems 0 (0 active), Total Flows 1
Total downstream bandwidth: 3750 Kbps
Total downstream reserved/reservable bandwidth: 0/3000 Kbps
Total downstream guaranteed/non-guaranteed bonus bandwidth: 10644/10643 Kbps

```

#### Related Commands

| Command                                         | Description                                                      |
|-------------------------------------------------|------------------------------------------------------------------|
| <b>show interface modular-cable accounting</b>  | Displays interface accounting information.                       |
| <b>show interface modular-cable description</b> | Displays a description for the interface.                        |
| <b>show interface modular-cable downstream</b>  | Displays downstream information for the narrowband channel.      |
| <b>show interface modular-cable dsg</b>         | Displays DOCSIS Set-Top Gateway (DSG) information per interface. |
| <b>show interface modular-cable intercept</b>   | Displays intercept stream information.                           |
| <b>show interface modular-cable stats</b>       | Displays interface packets and octets that were switched.        |
| <b>show interface modular-cable summary</b>     | Displays interface summary information.                          |
| <b>show interface modular-cable switching</b>   | Displays interface switching information.                        |

# show interface modular-cable accounting

To display interface accounting information, use the **show interface modular-cable accounting** command in privileged EXEC mode.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**show interface modular-cable** {*slot/subslot/bay:nb-channel-number*} **accounting**

## Cisco IOS Release 12.2(33)SCB

**show interface modular-cable** {*slot/bay/port:nb-channel-number*} **accounting**

| Syntax Description       |  |                                                                                                 |
|--------------------------|--|-------------------------------------------------------------------------------------------------|
| <i>slot</i>              |  | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
| <i>subslot</i>           |  | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.   |
| <i>bay</i>               |  | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
| <i>port</i>              |  | Specifies the interface number on the SPA.                                                      |
| <i>nb-channel-number</i> |  | Represents the narrowband channel number.                                                       |

| Command Default | No default values or behavior |
|-----------------|-------------------------------|
|-----------------|-------------------------------|

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                                                                                                                                                                                                   |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                     |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

**Examples**

The following is sample output from the **show interface modular-cable accounting** command for the modular-cable interface in slot 1, subslot 0, bay 0, and narrowband channel number 0:

```
Router# show interface modular-cable 1/0/0:0 accounting
Modular-Cable1/0/0:0
 Protocol Pkts In Chars In Pkts Out Chars Out
 IP 0 0 1286 131092
```

**Related Commands**



| Command                                            | Description                                                 |
|----------------------------------------------------|-------------------------------------------------------------|
| <b>show interface modular-cable description</b>    | Displays a description for the interface.                   |
| <b>show interface modular-cable downstream</b>     | Displays downstream information for the narrowband channel. |
| <b>show interface modular-cable dsg downstream</b> | Displays DOCSIS Set-Top Gateway (DSG) information.          |
| <b>show interface modular-cable intercept</b>      | Displays intercept stream information.                      |
| <b>show interface modular-cable stats</b>          | Displays interface packets and octets that were switched.   |
| <b>show interface modular-cable summary</b>        | Displays interface summary information.                     |
| <b>show interface modular-cable switching</b>      | Displays interface switching information.                   |

# show interface modular-cable description

To display a description for the interface, use the **show interface modular-cable description** command in privileged EXEC mode.

**Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA**

**show interface modular-cable {slot/subslot/bay:nb-channel-number} description**

**Cisco IOS Release 12.2(33)SCB**

**show interface modular-cable {slot/bay/port:nb-channel-number} description**

## Syntax Description

|                          |                                                                                                 |
|--------------------------|-------------------------------------------------------------------------------------------------|
| <i>slot</i>              | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
| <i>subslot</i>           | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.   |
| <i>bay</i>               | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
| <i>port</i>              | Specifies the interface number on the SPA.                                                      |
| <i>nb-channel-number</i> | Represents the narrowband channel number.                                                       |

## Command Default

No default behavior or values

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                                                   |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                     |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

## Examples

The following is sample output from the **show interface modular-cable description** command for the modular cable interface in slot 1, subslot 0, bay 0 and narrowband channel number 0:

```
Router# show interface modular-cable 1/0/0:0 description
Interface Status Protocol Description
Mo1/0/0:0 up up
```

## Related Commands

| Command                                            | Description                                                 |
|----------------------------------------------------|-------------------------------------------------------------|
| <b>show interface modular-cable accounting</b>     | Displays interface accounting information.                  |
| <b>show interface modular-cable downstream</b>     | Displays downstream information for the narrowband channel. |
| <b>show interface modular-cable dsg downstream</b> | Displays DOCSIS Set-Top Gateway (DSG) information.          |
| <b>show interface modular-cable intercept</b>      | Displays intercept stream information.                      |
| <b>show interface modular-cable summary</b>        | Displays interface summary information.                     |
| <b>show interface modular-cable stats</b>          | Displays interface packets and octets that were switched.   |
| <b>show interface modular-cable switching</b>      | Displays interface switching information.                   |

# show interface modular-cable dlm

To display DEPI Latency Measurement (DLM) information, use the **show interface modular-cable dlm** command in privileged EXEC mode.

```
show interface modular-cable {slot/bay/port:interface-number} dlm
```

|                    |                  |                                                                                                                 |
|--------------------|------------------|-----------------------------------------------------------------------------------------------------------------|
| Syntax Description | slot             | Slot where a SIP resides. On the Cisco uBR10012 universal broadband router, slots 1 and 3 can be used for SIPs. |
|                    | bay              | Bay in a SIP where a SPA is located. The valid values are 0 (upper bay) and 1 (lower bay).                      |
|                    | port             | Interface number on the SPA.                                                                                    |
|                    | interface-number | Modular-cable interface number.                                                                                 |

Command Default No default behavior or values

Command Modes Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

Examples The following is sample output of the **show interface modular-cable dlm** command for the modular cable interface in slot 1, bay 0, port 0, and modular-cable interface number 6:

```
Router# show interface Modular-Cable 1/0/0:6 dlm

DEPI Latency Measurements for Modular-Cable1/0/0:6
Current CIN Delay: 146 usecs
Current DLM: 4566
Average DLM (last 10): 1514
Max DLM: 5115
Min DLM: 913
Ingress DLM
SysUpTime Delay (Ticks)
x-----x-----x-----
0 831149 949
1 831159 1168
2 831170 4566
3 831076 1005
4 831087 983
5 831097 1185
6 831108 1139
7 831118 1144
8 831128 2013
9 831139 996
```

Table 233 describes the significant fields shown in the display.

**Table 233** *show interface modular-cable Field Descriptions*

| Field                 | Description                            |
|-----------------------|----------------------------------------|
| Current CIN Delay     | Current CIN delay value.               |
| Current DLM           | Current DLM value.                     |
| Average DLM (last 10) | Average DLM value.                     |
| Max DLM               | Maximum DLM .                          |
| Min DLM               | Minimum DLM.                           |
| SysUpTime             | The system up or active time.          |
| Delay (Ticks)         | The delay measured as number of ticks. |

#### Related Commands

| Command                                        | Description                                                       |
|------------------------------------------------|-------------------------------------------------------------------|
| <b>show interface modular-cable downstream</b> | Displays downstream information for the narrowband channel.       |
| <b>show interface modular-cable summary</b>    | Displays interface summary information.                           |
| <b>rf-channel network-delay</b>                | Configures the network delay for an RF channel on a Wideband SPA. |

# show interface modular-cable downstream

To display downstream information for the narrowband channel, use the **show interface modular-cable downstream** command in privileged EXEC mode.

Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**show interface modular-cable** {*slot/subslot/bay:nb-channel-number*} **downstream**

Cisco IOS Release 12.2(33)SCB

**show interface modular-cable** {*slot/bay/port:nb-channel-number*} **downstream**

Syntax Description

|                          |                                                                                                 |
|--------------------------|-------------------------------------------------------------------------------------------------|
| <i>slot</i>              | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
| <i>subslot</i>           | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.   |
| <i>bay</i>               | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
| <i>port</i>              | Specifies the interface number on the SPA.                                                      |
| <i>nb-channel-number</i> | Represents the narrowband channel number.                                                       |

Command Default

No default behavior or values

Command Modes

Privileged EXEC (#)

Command History

| Release     | Modification                                                                                                                                                                                                   |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                     |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

Examples

The following is sample output from the **show interface modular-cable downstream** command for the modular cable interface in slot 1, subslot 0, bay 0, and narrowband channel number 0:

```
Router# show interface modular-cable 1/0/0:0 downstream
Mo1/0/0:0: Downstream is up
 Total Modems 5 (5 active), Total Flows 6
 Total downstream bandwidth: 1940 Kbps
 Total downstream reserved bandwidth: 200 Kbps
```

Related Commands

| Command                                             | Description                                               |
|-----------------------------------------------------|-----------------------------------------------------------|
| <b>show interface modular-cable accounting</b>      | Displays interface accounting information.                |
| <b>show interface modular-cable description</b>     | Displays a description for the interface.                 |
| <b>show interface modular-cable dsgr downstream</b> | Displays DOCSIS Set-Top Gateway (DSG) information.        |
| <b>show interface modular-cable intercept</b>       | Displays intercept stream information.                    |
| <b>show interface modular-cable stats</b>           | Displays interface packets and octets that were switched. |
| <b>show interface modular-cable summary</b>         | Displays interface summary information.                   |
| <b>show interface modular-cable switching</b>       | Displays interface switching information.                 |

# show interface modular-cable intercept

To display intercept stream information, use the **show interface modular-cable intercept** command in privileged EXEC mode.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**show interface modular-cable** {*slot/subslot/bay:nb-channel-number*} **intercept**

## Cisco IOS Release 12.2(33)SCB

**show interface modular-cable** {*slot/bay/port:nb-channel-number*} **intercept**

| Syntax Description       |  |                                                                                                 |
|--------------------------|--|-------------------------------------------------------------------------------------------------|
| <i>slot</i>              |  | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
| <i>subslot</i>           |  | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.   |
| <i>bay</i>               |  | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
| <i>port</i>              |  | Specifies the interface number on the SPA.                                                      |
| <i>nb-channel-number</i> |  | Represents the narrowband channel number.                                                       |

|                        |                               |
|------------------------|-------------------------------|
| <b>Command Default</b> | No default behavior or values |
|------------------------|-------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| Command History | Release     | Modification                                                                                                                                                                                                   |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                     |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

**Examples**

The following is sample output from the **show interface modular-cable intercept** command for the modular cable interface in slot 1, subslot 0, bay 0, and narrowband channel number 0:

```
Router# show interface modular-cable 1/0/0:0 intercept
Interface Modular-Cable1/0/0:0 is a member of bundle 2. Reenter the command on t
he virtual bundle interface.
```

| Related Commands | Command                                         | Description                                |
|------------------|-------------------------------------------------|--------------------------------------------|
|                  | <b>show interface modular-cable accounting</b>  | Displays interface accounting information. |
|                  | <b>show interface modular-cable description</b> | Displays a description for the interface.  |



| Command                                            | Description                                                 |
|----------------------------------------------------|-------------------------------------------------------------|
| <b>show interface modular-cable downstream</b>     | Displays downstream information for the narrowband channel. |
| <b>show interface modular-cable dsg downstream</b> | Displays DOCSIS Set-Top Gateway (DSG) information.          |
| <b>show interface modular-cable stats</b>          | Displays interface packets and octets that were switched.   |
| <b>show interface modular-cable summary</b>        | Displays interface summary information.                     |
| <b>show interface modular-cable switching</b>      | Displays interface switching information.                   |

# show interface modular-cable multicast-sessions

To display information about multicast sessions on a specific modular-cable interface, use the **show interface modular-cable multicast-sessions** command in privileged EXEC mode.

```
show interface modular-cable {slot/{subslot | bay}/port:interface-number}
 [group [ipv4-MQoS-group | ipv6-MQoS-group] | latency | sid [MQoS-sid]]
```

| Syntax Description                                     |                                                                                                               |                                                                                                                                                                                                                                            |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                                            | Slot where the line card resides.                                                                             | <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul> |
| <i>subslot</i>                                         | (Cisco uBR10012 only) Secondary slot of the cable interface line card. The valid subslots are 0 or 1.         |                                                                                                                                                                                                                                            |
| <i>bay</i>                                             | Bay where the Cisco Wideband SPA is located. The valid range is from 0 to 3.                                  |                                                                                                                                                                                                                                            |
| <i>port</i>                                            | Downstream port number.                                                                                       | <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>     |
| <i>interface-number</i>                                | Modular-cable interface number. The valid range is from 0 to 23.                                              |                                                                                                                                                                                                                                            |
| <b>group</b><br>[ipv4-MQoS-group  <br>ipv6-MQoS-group] | Displays information about the specified IPv4 or IPv6 multicast quality of service (MQoS) group.              |                                                                                                                                                                                                                                            |
| <b>latency</b>                                         | Displays information about the multicast session latency.                                                     |                                                                                                                                                                                                                                            |
| <b>sid</b> [MQoS-sid]                                  | Displays information about the MQoS service identifier (SID). The value of the SID ranges from 8192 to 12272. |                                                                                                                                                                                                                                            |

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| Command History | Release     | Modification                                                                                                                                                                                                   |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |
|                 | 12.2(33)SCF | This command was modified. The <b>latency</b> keyword was added.                                                                                                                                               |

## Examples

The following is a sample output from the **show interface modular-cable multicast-sessions** command:

```
Router# show interface modular-cable 1/1/0:0 multicast-sessions

Default Multicast Service Flow 7 on Modular-Cable1/1/0:0
Multicast Group : 230.1.2.5
 Source : N/A
 Act GCRs : 1
 Interface : Bu1 State: A GI: Bu1 RC: 0

 GCR : GC SAID SFID Key GQC GEn
 1 8198 18 0 1 0
```

The following is a sample output from the **show interface modular-cable multicast-sessions group** command:

```
Router# show interface modular-cable 1/1/0:0 multicast-sessions group 230.1.2.5

Multicast Group : 230.1.2.5
 Source : N/A
 Act GCRs : 1
 Interface : Bu1 State: A GI: Bu1 RC: 0

 GCR : GC SAID SFID Key GQC GEn
 1 8198 18 0 1 0
```

The following is a sample output from the **show interface modular-cable multicast-sessions latency** command:

```
Router# show interface modular-cable 1/1/0:0 multicast-sessions latency

Session (S,G) : (*,230.1.2.5)
Fwd Intfc : Mo1/1/0:0
MQoS Entered at MQoS Exit at
Mar 6 23:13:16.223 Mar 6 23:13:16.223
GC SAID SFID SF req SF rsp
1 8198 18 Mar 6 23:13:16.223 Mar 6 23:13:16.283
```

The following is a sample output from the **show interface modular-cable multicast-sessions sid** command:

```
Router# show interface modular-cable 1/1/0:0 multicast-sessions sid 8198

Multicast Group : 230.1.2.5
 Source : N/A
 Act GCRs : 1
 Interface : Bu1 State: A GI: Bu1 RC: 0

 GCR : GC SAID SFID Key GQC GEn
 1 8198 18 0 1 0
```

## Related Commands

| Command                                         | Description                                                     |
|-------------------------------------------------|-----------------------------------------------------------------|
| <b>show interface modular-cable accounting</b>  | Displays interface modular-cable accounting information.        |
| <b>show interface modular-cable description</b> | Displays the description of the modular-cable interface.        |
| <b>show interface modular-cable downstream</b>  | Displays the downstream information for the narrowband channel. |

| Command                                                 | Description                                                                               |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>show interface modular-cable dsg</b>                 | Displays the DOCSIS Set-Top Gateway (DSG) information per modular-cable interface.        |
| <b>show interface modular-cable intercept</b>           | Displays the intercept stream information of the interface modular-cable.                 |
| <b>show interface modular-cable stats</b>               | Displays the interface modular-cable packets and octets that were switched.               |
| <b>show interface modular-cable summary</b>             | Displays the interface modular-cable summary information.                                 |
| <b>show interface modular-cable switching</b>           | Displays the interface modular-cable switching information.                               |
| <b>show interface wideband-cable multicast-sessions</b> | Displays the information about multicast sessions on a specific wideband-cable interface. |
| <b>show interface cable multicast-sessions</b>          | Displays the information about the multicast sessions on a specific cable interface.      |

# show interface modular-cable stats

To display interface packets and octets that were switched, use the **show interface modular-cable stats** command in privileged EXEC mode.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**show interface modular-cable** {*slot/subslot/bay:nb-channel-number*} **stats**

## Cisco IOS Release 12.2(33)SCB

**show interface modular-cable** {*slot/bay/port:nb-channel-number*} **stats**

| Syntax Description       |  |                                                                                                 |
|--------------------------|--|-------------------------------------------------------------------------------------------------|
| <i>slot</i>              |  | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
| <i>subslot</i>           |  | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.   |
| <i>bay</i>               |  | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
| <i>port</i>              |  | Specifies the interface number on the SPA.                                                      |
| <i>nb-channel-number</i> |  | Represents the narrowband channel number.                                                       |

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                                                   |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                     |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

**Examples** The following is sample output from the **show interface modular-cable stats** command for the modular cable interface in slot 1, subslot 0, bay 0, and narrowband channel number 0:

```
Router# show interface modular-cable 1/0/0:0 stats
Modular-Cable1/0/0:0
 Switching path Pkts In Chars In Pkts Out Chars Out
 Processor 0 0 0 0
 Route cache 0 0 509 41582
 Total 0 0 509 41582
```

**Related Commands**

| Command                                            | Description                                                 |
|----------------------------------------------------|-------------------------------------------------------------|
| <b>show interface modular-cable accounting</b>     | Displays interface accounting information.                  |
| <b>show interface modular-cable description</b>    | Displays a description for the interface.                   |
| <b>show interface modular-cable downstream</b>     | Displays downstream information for the narrowband channel. |
| <b>show interface modular-cable dsg downstream</b> | Displays DOCSIS Set-Top Gateway (DSG) information.          |
| <b>show interface modular-cable intercept</b>      | Displays intercept stream information.                      |
| <b>show interface modular-cable switching</b>      | Displays interface switching information.                   |
| <b>show interface modular-cable summary</b>        | Displays interface summary information.                     |

# show interface modular-cable summary

To display interface summary information, use the **show interface modular-cable summary** command in privileged EXEC mode.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**show interface modular-cable** {*slot/subslot/bay:nb-channel-number*} **summary**

## Cisco IOS Release 12.2(33)SCB

**show interface modular-cable** {*slot/bay/port:nb-channel-number*} **summary**

| Syntax Description       |  |                                                                                                 |
|--------------------------|--|-------------------------------------------------------------------------------------------------|
| <i>slot</i>              |  | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
| <i>subslot</i>           |  | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.   |
| <i>bay</i>               |  | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
| <i>port</i>              |  | Specifies the interface number on the SPA.                                                      |
| <i>nb-channel-number</i> |  | Represents the narrowband channel number.                                                       |

**Command Default** No default values or behavior

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                                                   |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(23)BC  | This command was introduced in the Cisco uBR10012 router.                                                                                                                                                      |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

**Examples** The following is sample output from the **show interface modular-cable summary** command for the modular cable interface in slot 1, subslot 0, bay 0, and narrowband channel number 0:

Router# **show interface modular-cable 1/0/0:0 summary**

```

*: interface is up
IHQ: pkts in input hold queue IQD: pkts dropped from input queue
OHQ: pkts in output hold queue OQD: pkts dropped from output queue
RXBS: rx rate (bits/sec) RXPS: rx rate (pkts/sec)
TXBS: tx rate (bits/sec) TXPS: tx rate (pkts/sec)
TRTL: throttle count

```

```

Interface IHQ IQD OHQ OQD RXBS RXPS TXBS TXPS TRTL

```

show interface modular-cable summary

```

* Modular-Cable1/0/0:0 0 0 0 2 0 0 0 0 0
NOTE:No separate counters are maintained for subinterfaces
 Hence Details of subinterface are not shown
```

| Related Commands | Command                                     | Description                                                 |
|------------------|---------------------------------------------|-------------------------------------------------------------|
|                  | show interface modular-cable accounting     | Displays interface accounting information.                  |
|                  | show interface modular-cable description    | Displays a description for the interface.                   |
|                  | show interface modular-cable downstream     | Displays downstream information for the narrowband channel. |
|                  | show interface modular-cable dsg downstream | Displays DOCSIS Set-Top Gateway (DSG) information.          |
|                  | show interface modular-cable intercept      | Displays intercept stream information.                      |
|                  | show interface modular-cable stats          | Displays interface packets and octets that were switched.   |
|                  | show interface modular-cable switching      | Displays interface switching information.                   |



# show interface modular-cable switching

To display interface switching information, use the **show interface modular-cable switching** command in privileged EXEC mode.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**show interface modular-cable** {*slot/subslot/bay:nb-channel-number*} **switching**

## Cisco IOS Release 12.2(33)SCB

**show interface modular-cable** {*slot/bay/port:nb-channel-number*} **switching**

| Syntax Description       |  |                                                                                                 |
|--------------------------|--|-------------------------------------------------------------------------------------------------|
| <i>slot</i>              |  | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for SIPs. |
| <i>subslot</i>           |  | The subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.   |
| <i>bay</i>               |  | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).      |
| <i>port</i>              |  | Specifies the interface number on the SPA.                                                      |
| <i>nb-channel-number</i> |  | Represents the narrowband channel number.                                                       |

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                                                   |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(23)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                     |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a modular cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

**Examples** The following is sample output from the **show interface modular-cable switching** command for the modular cable interface in slot 1, subslot 0, bay 0, and narrowband channel number 0:

```
Router# show interface modular-cable 1/0/0:0 switching
Modular-Cable1/0/0:0
```

```

Protocol IP
Switching path Pkts In Chars In Pkts Out Chars Out
Process 0 0 0 0
Cache misses 0 - - -
Fast 0 0 457 37670
Auton/SSE 0 0 0 0
```

**show interface modular-cable switching**

NOTE: all counts are cumulative and reset only after a reload.

| Related Commands | Command                                            | Description                                                 |
|------------------|----------------------------------------------------|-------------------------------------------------------------|
|                  | <b>show interface modular-cable accounting</b>     | Displays interface accounting information.                  |
|                  | <b>show interface modular-cable description</b>    | Displays a description for the interface.                   |
|                  | <b>show interface modular-cable downstream</b>     | Displays downstream information for the narrowband channel. |
|                  | <b>show interface modular-cable dsg downstream</b> | Displays DOCSIS Set-Top Gateway (DSG) information.          |
|                  | <b>show interface modular-cable intercept</b>      | Displays intercept stream information.                      |
|                  | <b>show interface modular-cable stats</b>          | Displays interface packets and octets that were switched.   |
|                  | <b>show interface modular-cable summary</b>        | Displays interface summary information.                     |

# show interface multicast-gcr

To display the details of the Group Classifier Rule, use the **show interface multicast-gcr** command in privileged EXEC mode.

```
show interface {cable slot/subslot/port | modular-cable slot/bay/port:channel | wideband-cable slot/bay/port:channel} multicast-gcr
```

| Syntax Description | <b>cable</b> <i>slot/subslot/port</i>              | Identifies the cable interface for which information should be displayed, where: <ul style="list-style-type: none"><li>slot—0 to 8</li><li>subslot—0 or 1</li><li>port—0 to 4</li></ul>                   |
|--------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <b>modular-cable</b> <i>slot/bay/port:channel</i>  | Identifies the cable interface for which information should be displayed, where: <ul style="list-style-type: none"><li>slot—0 to 8</li><li>bay—0 or 1</li><li>port—0</li><li>channel—0</li></ul>          |
|                    | <b>wideband-cable</b> <i>slot/bay/port:channel</i> | Identifies the wideband cable interface for which information should be displayed, where: <ul style="list-style-type: none"><li>slot—0 to 8</li><li>bay—0 or 1</li><li>port—0</li><li>channel—0</li></ul> |

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

|                         |                                                                       |
|-------------------------|-----------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Use this command to display the details of the Group Classifier Rule. |
|-------------------------|-----------------------------------------------------------------------|

Examples

The following example shows a sample output for the **show interface multicast-gcr** command:

```
Router# show interface wideband-cable 1/1/0:0 multicast-gcr

Group Classifier Rules on Wideband-Cable1/1/0:0:
Classifier_id Group_id Group_Qos_id Sid SFID ref_count
7 1 1 8196 10 1
8 2 1 8197 11 1
```

Table 234 describes the significant fields shown in the display.

**Table 234** show interface multicast-gcr Field Descriptions

| Field         | Description                                                             |
|---------------|-------------------------------------------------------------------------|
| Classifier_id | Displays group classifier ID.                                           |
| Group_id      | Displays group ID number of the Group Classifier Rules.                 |
| Group_Qos_id  | Displays group QoS ID number of the Group Classifier Rules.             |
| Sid           | Displays information for the service identifier on the cable interface. |
| SFID          | Displays service flow identifier (SFID).                                |
| ref_count     | Displays the reference count.                                           |

Related Commands

| Command                           | Description                                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------|
| show interface cable service-flow | Displays the attributes of DOCSIS service flows on a given cable interface.                                     |
| show cable multicast db           | Displays the contents of multicast explicit tracking database.                                                  |
| show cable multicast qos          | Displays the configuration information for MQoS, (Group-Config, Group-QoS-Config, and Group-Encryption-Config). |

# show interface port-channel

To display the EtherChannel interfaces and channel identifiers, with their mode and operational status, use the **show interface port-channel** command in privileged EXEC mode.

```
show interface port-channel {number}
```

## Syntax Description

|        |                                                                                                                     |
|--------|---------------------------------------------------------------------------------------------------------------------|
| number | Optional value enables the display of information for one port channel interface number. The range is from 1 to 64. |
|--------|---------------------------------------------------------------------------------------------------------------------|

## Defaults

No default behaviors or values.

## Command Modes

Privileged EXEC

## Command History

| Release     | Modification                                                |
|-------------|-------------------------------------------------------------|
| 12.2(11)BC3 | This command was introduced on the Cisco uBR7246VXR router. |
| 12.2(9a)BC  | This command was introduced on the Cisco uBR10012 router.   |

## Examples

The following example illustrates Gigabit EtherChannel (GEC) information for the port-channel interface of 2 as configured on a Cisco uBR10012 router with the PRE2 performance routing engine model.

This configuration is comprised of three GEC port channels as follows:

- Member 0 is the GEC interface bundle master.
- Member 2 is the final slave interface in this GEC group.
- These three port-channel interfaces (members) comprise one GEC group that is set up with a GEC peer on the network.

```
Router# show interface port-channel 2
Port-channel2 is up, line protocol is up
 Hardware is GEChannel, address is 8888.8888.8888 (bia 0000.0000.0000)
 Internet address is 101.101.101.1/16
 MTU 1500 bytes, BW 3000000 Kbit, DLY 10 usec,
 reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation ARPA, loopback not set
 Keepalive set (10 sec)
 ARP type: ARPA, ARP Timeout 04:00:00
 No. of members in this channel: 3
 No. of configured members in this channel: 3
 No. of passive members in this channel: 0
 No. of active members in this channel: 3
 Member 0 : GigabitEthernet1/0/0 , Full-duplex, 1000Mb/s
 Member 1 : GigabitEthernet3/0/0 , Full-duplex, 1000Mb/s
 Member 2 : GigabitEthernet2/0/0 , Full-duplex, 1000Mb/s
 No. of Non-active members in this channel: 0
```

**show interface port-channel**

```

Last input 00:00:02, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/225/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/120 (size/max)
30 second input rate 17292000 bits/sec, 9948 packets/sec
30 second output rate 17315000 bits/sec, 9935 packets/sec
 866398790 packets input, 3324942446 bytes, 0 no buffer
 Received 2 broadcasts, 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
 0 watchdog, 0 multicast, 0 pause input
 0 input packets with dribble condition detected
866394055 packets output, 3323914794 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 babbles, 0 late collision, 0 deferred
 0 lost carrier, 0 no carrier, 0 pause output
 0 output buffer failures, 0 output buffers swapped out

```

The following example illustrates GEC information for the port-channel interface of 2 as configured on a Cisco uBR7246VXR router.

This configuration is comprised of three port-channel interfaces (members) as follows:

- Member 0 is the GEC interface bundle master.
- Member 2 is the final slave interface in this GEC group.
- These three port-channel interfaces (members) comprise one GEC group that is set up with a GEC peer on the network.

```

Router# show interfaces port-channel 2
Port-channel2 is up, line protocol is up
 Hardware is GEChannel, address is 000b.bf7d.9c01 (bia 000b.bf7d.9c00)
 Internet address is 101.101.101.2/16
 MTU 1500 bytes, BW 3000000 Kbit, DLY 10 usec,
 reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation ARPA, loopback not set
 Keepalive set (10 sec)
 ARP type: ARPA, ARP Timeout 04:00:00
 No. of members in this channel: 3
 No. of configured members in this channel: 3
 No. of passive members in this channel: 0
 No. of active members in this channel: 3
 Member 0 : GigabitEthernet0/3 , Full-duplex, 1000Mb/s
 Member 1 : GigabitEthernet0/2 , Full-duplex, 1000Mb/s
 Member 2 : GigabitEthernet0/1 , Full-duplex, 1000Mb/s
 No. of Non-active members in this channel: 0
 Last input 00:13:48, output never, output hang never
 Last clearing of "show interface" counters never
 Input queue: 0/225/0/0 (size/max/drops/flushes); Total output drops: 0
 Queueing strategy: fifo
 Output queue: 0/120 (size/max)
 30 second input rate 17358000 bits/sec, 9999 packets/sec
 30 second output rate 17359000 bits/sec, 10000 packets/sec
 868633935 packets input, 3809968911 bytes, 0 no buffer
 Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
 0 watchdog, 0 multicast, 0 pause input
 0 input packets with dribble condition detected
 868642883 packets output, 3811242413 bytes, 0 underruns
 2 output errors, 0 collisions, 0 interface resets
 0 babbles, 0 late collision, 0 deferred
 2 lost carrier, 0 no carrier, 0 pause output
 0 output buffer failures, 0 output buffers swapped out

```

The following example illustrates FastEtherChannel (FEC) information for the specified port channel interface as configured on a Cisco uBR7246VXR router.

This configuration is comprised of four port channel interfaces (members) as follows:

- Member 0
- Member 0 is the GEC interface bundle master.
- Member 3 is the final slave interface in this FEC group.
- These four port-channel interfaces (members) comprise one FEC group that is set up with an FEC peer on the network.

```
Router# show interfaces port-channel 1
Port-channel1 is up, line protocol is up
 Hardware is FEChannel, address is 000b.bf7d.9c1c (bia 000b.bf7d.9c00)
 Description: test
 Internet address is 100.100.100.1/24
 MTU 1500 bytes, BW 400000 Kbit, DLY 100 usec,
 reliability 255/255, txload 11/255, rxload 11/255
 Encapsulation ARPA, loopback not set
 Keepalive set (10 sec)
 ARP type: ARPA, ARP Timeout 04:00:00
 No. of members in this channel: 4
 No. of configured members in this channel: 4
 No. of passive members in this channel: 0
 No. of active members in this channel: 4
 Member 0 : FastEthernet2/1 , Full-duplex, 100Mb/s
 Member 1 : FastEthernet2/0 , Full-duplex, 100Mb/s
 Member 2 : FastEthernet1/1 , Full-duplex, 100Mb/s
 Member 3 : FastEthernet1/0 , Full-duplex, 100Mb/s
 No. of Non-active members in this channel: 0
 Last input 00:14:48, output never, output hang never
 Last clearing of "show interface" counters never
 Input queue: 0/300/0/0 (size/max/drops/flushes); Total output drops: 0
 Queueing strategy: fifo
 Output queue: 0/160 (size/max)
 30 second input rate 17358000 bits/sec, 9998 packets/sec
 30 second output rate 17357000 bits/sec, 9998 packets/sec
 869366601 packets input, 3968956491 bytes
 Received 3 broadcasts, 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
 0 watchdog
 0 input packets with dribble condition detected
 868944538 packets output, 3876736548 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 babbles, 0 late collision, 0 deferred
 0 lost carrier, 0 no carrier
 0 output buffer failures, 0 output buffers swapped out
```

# show interface rf-status

To display the logical UP and DOWN state for each of the configured RF channels for a wideband interface, use the **show interface rf-status** command in privileged EXEC mode.

**Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers**

```
show interface wideband-cable slot/port:wideband-channel rf-status
```

**Cisco uBR10012 Universal Broadband Router**

```
show interface wideband-cable slot/bay/port:wideband-channel rf-status
```

**Syntax Description**

|                         |                                                                                                                                                                                                                                                                  |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>             | Slot where the line card resides.<br><br>Cisco uBR7246VXR router—The valid range is from 3 to 6.<br><br>Cisco uBR7225VXR router—The valid range is from 1 to 2.<br><br>Cisco uBR10012 router—The valid range is from 5 to 8. Slots 1 and 3 can be used for SIPs. |
| <i>bay</i>              | The bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).                                                                                                                                                                       |
| <i>port</i>             | Specifies the downstream port number.                                                                                                                                                                                                                            |
| <i>wideband-channel</i> | Represents the wideband channel number.                                                                                                                                                                                                                          |

**Command Default**

The default logical state of each channel is UP.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                    |
|-------------|-------------------------------------------------------------------------------------------------|
| 12.2(33)SCB | This command was introduced.                                                                    |
| 12.2(33)SCD | This command was modified. Support was added for Cisco uBR7225VXR and Cisco uBR7246VXR routers. |

**Usage Guidelines**

The default logical state of each channel is UP. The state is set to DOWN when the threshold configured using **cable rf-change-trigger** command is reached.



**Examples**

The following is a sample output of the **show interface rf-status** command on a wideband cable interface on a Cisco uBR10012 router:

```
Router# show interface wideband-cable 1/0/0:3 rf-status
```

```

 Logical
RF Status
-- -----
17 UP
18 UP
19 UP

```

The following is a sample output of the **show interface rf-status** command on a wideband cable interface on a Cisco uBR7225VXR router:

```
Router# show interface Wideband-Cable 5/1:0 rf-status
```

```

 Logical
Resource RF Status

5/1 0 UP
 1 UP
 2 UP

```

[Table 235](#) describes the significant fields shown in the display.

**Table 235** *show interface rf-status Field Descriptions*

| Field          | Description                                                 |
|----------------|-------------------------------------------------------------|
| Resource       | The interface information.                                  |
| RF             | Cable interface line card or SPA downstream channel number. |
| Logical Status | The logical status of the RF channel. Default is UP.        |

**Related Commands**

| Command                     | Description                                    |
|-----------------------------|------------------------------------------------|
| <b>show cable rf-status</b> | Displays the logical state of all RF channels. |

# show interface wideband-cable

To display the current configuration and status for a wideband channel, use the **show interface wideband-cable** command in privileged EXEC mode.

## Cisco uBR10012 Universal Broadband Router

Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

**show interface wideband-cable** *slot/subslot/bay:wideband\_channel* [*options*]

Cisco IOS Release 12.2(33)SCB

**show interface wideband-cable** *slot/bay/port:wideband\_channel* [*options*]

Cisco IOS Release 12.2(33)SCC

**show interface wideband-cable** *slot/subslot/port:wideband\_channel* [*options*]

## Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers

Cisco IOS Release 12.2(33)SCD

**show interface wideband-cable** *slot/port:wideband\_channel* [*options*]

### Syntax Description

|                         |                                                                                                                                                                                                                                                                                                                         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>             | Slot where a SIP or line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>Cisco uBR10012 router—The valid range is from 5 to 8, and slots 1 and 3 can be used for SIP.</li> </ul> |
| <i>subslot</i>          | Subslot where a SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified.                                                                                                                                                                                                                               |
| <i>bay</i>              | Bay in a SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).                                                                                                                                                                                                                                  |
| <i>port</i>             | Specifies the port number. <ul style="list-style-type: none"> <li>Cisco uBR7246VXR router and Cisco uBR7225VXR router—The valid range is from 0 to 1.</li> <li>Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>                                                      |
| <i>wideband-channel</i> | Represents the wideband channel number. Valid values are from 0 to 31. On the Cisco uBR7246VXR and Cisco uBR7225VXR routers, the valid values are from 0 to 5.                                                                                                                                                          |

*options*

The following non-cable specific options generate information for wideband cable interfaces:

- **accounting**—Displays the number of packets of each protocol type that was sent through the interface.
- **description**—Displays the description entered for the interface.
- **dbb**—Displays DBS scheduler information. The **dbb** option is available only on the Cisco uBR7225VXR and Cisco uBR7246VXR routers.
- **downstream**—Displays reserved and reservable bandwidth information.
- **multicast-sessions**—Displays information about the multicast sessions on a specific wideband-cable interface.
- **privacy**—Displays privacy group information.
- **service-flow**—Displays the attribute-based assignment of service flows on a cable interface.
- **stats**—Displays packets that were switched.
- **summary**—Displays interface summary information.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                  |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced on the Cisco uBR10012 router.                                                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                               |
| 12.2(33)SCB | This command was modified to change the addressing format for a wideband cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> .               |
| 12.2(33)SCD | This command was modified. Support was added for Cisco uBR7225VXR and Cisco uBR7246VXR routers. The <b>dbb</b> , and <b>service-flow</b> keywords were added. |
| 12.2(33)SCF | This command was modified. The <b>downstream</b> keyword was enhanced to capture fairness across DOCSIS interfaces related information.                       |

**Usage Guidelines**

Some of the non-cable specific options do not generate any meaningful information for wideband cable interfaces. For information on the non-cable specific options, see the Cisco IOS Release 12.3 documentation on [Cisco.com](http://Cisco.com).

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

## Examples

The following is a sample output for the **show interface wideband-cable** command:

```
Router# show interface wideband-cable 1/0/0:1

Wideband-Cable1/0/0:1 is up, line protocol is up
 Hardware is Wideband CMTS Cable interface, address is 0012.001a.8897 (bia
0012.001a.8897)
 MTU 1500 bytes, BW 74730 Kbit, DLY 1000 usec,
 reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation MCNS, loopback not set
 Keepalive set (10 sec)
 ARP type: ARPA, ARP Timeout 04:00:00
 Last input never, output 00:00:09, output hang never
 Last clearing of "show interface" counters never
 Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
 Queueing strategy: fifo
 Output queue: 0/40 (size/max)
 30 second input rate 0 bits/sec, 0 packets/sec
 30 second output rate 0 bits/sec, 0 packets/sec
 0 packets input, 0 bytes, 0 no buffer
 Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 24224 packets output, 1222002 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 output buffer failures, 0 output buffers swapped out
```

The following is a sample output for the **show interface wideband-cable accounting** command:

```
Router# show interface wideband-cable 1/0/0:0 accounting

Wideband-Cable1/0/0:1
 Protocol Pkts In Chars In Pkts Out Chars Out
 IP 0 0 56493807 7909133546
```

The following is a sample output for the **show interface wideband-cable description** command:

```
Router# show interface wideband-cable 1/0/0:0 description

Interface Status Protocol Description
Wi1/0/0:1 up up
```

The following is a sample output for the **show interface wideband-cable dbs** command:

```
Router# show interface wideband-cable 3/0:0 dbs

Dynamic Bandwidth Sharing is enabled
bg_rf_channel_bitmap_local B, active 0
RF 0: tokens 23254, active 0, policer 4687 KB/s, max_tokens 23435
 deficit counter 0, quantum 2000
 ticks_limit: 62500, max_ticks:625000, policer(ticks): 312
RF 1: tokens 23249, active 0, policer 4687 KB/s, max_tokens 23435
 deficit counter 0, quantum 5000
 ticks_limit: 62500, max_ticks:625000, policer(ticks): 312
RF 3: tokens 23249, active 0, policer 4687 KB/s, max_tokens 23435
 deficit counter 0, quantum 10000
```

The following is a sample output for the **show interface wideband-cable downstream** command:

```
Router# show interface wideband-cable 1/0/0:1 downstream

Total downstream bandwidth 3235 Kbps
Total downstream reserved/reservable bandwidth 0/200 Kbps
Total downstream guaranteed/non-guaranteed bonus bandwidth 66618/9972 Kbps
```

The following is a sample output for the **show interface wideband-cable service-flow** command:

Router# **show interface wideband-cable 3/0:0 service-flow**

| Sfid | Sid  | Mac Address    | QoS  | Param | Index | Type | Dir | Curr  | Active | DS-ForwIf/ |
|------|------|----------------|------|-------|-------|------|-----|-------|--------|------------|
|      |      |                | Prov | Adm   | Act   |      |     | State | Time   | US-BG/CH   |
| 3    | 8193 | ffff.ffff.ffff | 3    | 3     | 3     | S(s) | DS  | act   | 2h06m  | Wi5/1:0    |

The following is a sample output for the **show interface wideband-cable privacy** command:

Router# **show interface wideband-cable 1/0/0:1 privacy all**

```
EAE Configuration
 Policy: EAE Enforcement disabled

KEK Configuration
 KEK lifetime: 604800
 Auth Infos: 0
 Auth Requests: 0, Auth Replies: 0
 Auth Rejects: 0, Auth Invalids: 0
 Packet Buffer Failures: 0

TEK Configuration
 TEK lifetime: 43200
 TEK Requests: 0, TEK Replies: 0
 TEK Rejects: 0, TEK Invalids: 0
 SAMap Requests: 0, SAMap Replies: 0
 SAMap Rejects: 0

Interface Configuration
 SelfSigned Trust: Untrusted
 Check Cert Validity Periods: True
```

The following is a sample output for the **show interface wideband-cable stats** command:

Router# **show interface wideband-cable 1/0/0:1 stats**

| Wideband-Cable1/0/0:1 |  | Pkts In | Chars In | Pkts Out | Chars Out  |
|-----------------------|--|---------|----------|----------|------------|
| Switching path        |  |         |          |          |            |
| Processor             |  | 0       | 0        | 0        | 0          |
| Route cache           |  | 0       | 0        | 56493807 | 7909133546 |
| Total                 |  | 0       | 0        | 56493807 | 7909133546 |

The following is a sample output for the **show interface wideband-cable summary** command:

Router# **show interface wideband-cable 1/0/0:1 summary**

```
*: interface is up
IHQ: pkts in input hold queue IQD: pkts dropped from input queue
OHQ: pkts in output hold queue OQD: pkts dropped from output queue
RXBS: rx rate (bits/sec) RXPS: rx rate (pkts/sec)
TXBS: tx rate (bits/sec) TXPS: tx rate (pkts/sec)
TRTL: throttle count
```

| Interface              | XPS | TXBS | TXPS | IHQ | TRTL | IQD | OHQ | OQD | RXBS | R |
|------------------------|-----|------|------|-----|------|-----|-----|-----|------|---|
| *Wideband-Cable1/0/0:1 | 0   | 0    | 0    | 0   | 0    | 0   | 0   | 0   | 0    |   |

The following is a sample output for the **show interface wideband-cable multicast-sessions** command:

Router# **show interface wideband-cable 7/0/0:0 multicast-sessions**

**show interface wideband-cable**

```

Default Multicast Service Flow 3 on Wideband-Cable7/0/0:0
Multicast Group : 230.1.1.1
 Source : N/A
 Act GCRs : 1
 Interface : Bu1 State: A GI: Bu1 RC: 0

 GCR : GC SAID SFID Key GQC GEn
 1 8200 4 30 1 1

```

Table 236 describes the fields shown in the **show interface wideband-cable** display.

**Table 236** *show interface wideband-cable Field Descriptions*

| Field                                                                     | Description                                                                                                                                                |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wideband-Cable slot/subslot/bay:wb-channel is up/...administratively down | Indicates whether the interface hardware is currently active or taken down by the administrator.                                                           |
| line protocol is up/...administratively down                              | Indicates whether the software processes that handle the line protocol believe the interface is usable or if it has been taken down by the administrator.  |
| hardware                                                                  | Hardware type and address.                                                                                                                                 |
| Internet address                                                          | Internet address followed by subnet mask.                                                                                                                  |
| MTU                                                                       | Maximum transmission unit (MTU) of the interface.                                                                                                          |
| BW                                                                        | Bandwidth of the interface in kilobits per second.                                                                                                         |
| DLY                                                                       | Delay of the interface in microseconds.                                                                                                                    |
| rely                                                                      | Reliability of the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is 100 percent reliability.) |
| load                                                                      | Load on the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is complete saturation.)            |
| Encapsulation                                                             | Encapsulation method assigned to this interface.                                                                                                           |
| Keepalive set                                                             | Keepalive time interval.                                                                                                                                   |
| ARP type                                                                  | Type of Address Resolution Protocol (ARP) and timeout value assigned.                                                                                      |
| Last input                                                                | Number of hours, minutes, and seconds since the last packet was successfully received by an interface.                                                     |
| output                                                                    | Number of hours, minutes, and seconds since the last packet was successfully sent by an interface.                                                         |
| Last clearing of "show interface" counters                                | Time at which the counters that measure cumulative statistics (such as number of bytes sent and received) were last reset to zero.                         |

**Table 236**      *show interface wideband-cable Field Descriptions*

| Field                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Queueing strategy                                 | Displays the type of queueing configured for this interface. In the following example output, the type of queueing configured is first-in first-out (FIFO).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Output queue                                      | Number of packets in the output queue. The format of this number is A/B, where A indicates the number of packets in the queue, and B indicates the maximum number of packets allowed in the queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| drops                                             | Indicates the number of packets dropped because of a full queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| input queue/drops                                 | Number of packets in the input queue. The format of this number is A/B, where A indicates the number of packets in the queue, and B indicates the maximum number of packets allowed in the queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| drops                                             | Indicates the number of packets dropped because of a full queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Five minute input rate<br>Five minute output rate | Average number of bits and packets sent per second in the last five minutes. The five-minute interval is the default time period for statistics collection and can be changed for each individual cable interface using the <b>load-interval</b> command in interface configuration mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>                                       | <p>These statistics are calculated using a decayed averaging method, where only the average is stored over the interval period, not the individual samples. Every time a sample average is taken, a percentage of the sample and a percentage of the average are added together to create the new average. If traffic stops for a time period, these statistics do not immediately go to zero but drop with a decay rate of about 70 percent per time period.</p> <p>For example, if the interface is passing 1,000 packets per second (pps) before traffic stops, the <b>show interface cable</b> command shows the rate being 300 pps at the end of the first time interval. The rate then drops to 90 pps at the end of the second time interval, and so forth.</p> |
| packets input                                     | Total number of error-free packets received by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| bytes input                                       | Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| no buffer                                         | Number of received packets discarded because there was no buffer space in the main system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Received broadcast                                | Total number of broadcast or multicast packets received by the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| runt                                              | Number of packets that are discarded because they are smaller than the medium's minimum packet size.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 236**      *show interface wideband-cable Field Descriptions*

| Field          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| giants         | <p>Number of packets that are discarded because they are bigger than the standard Ethernet Maximum Transmission Unit (MTU) size. For Ethernet packets, RFC 1757 defines giants as “the total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.”</p> <p><b>Note</b> In addition, to account for the different Ethernet and other packet encapsulations on the network, packets are considered giants when they exceed the configured MTU size plus 114 bytes.</p> |
| input errors   | Total number of errors received on the interface. This count includes runs and giants, which are shown above, as well as other errors, such as no buffers, and CRC, frame, overrun, and ignored counts. This count can also include DOCSIS protocol errors such as an invalid SID in the DOCSIS frame, a bad extended header length, corrupted concatenated packets, and invalid bandwidth requests.                                                                                                                                                           |
| CRC            | Indicates the number of times the cyclic redundancy checksum (CRC) generated by the originating LAN station or far-end device does not match the checksum calculated from the data received.                                                                                                                                                                                                                                                                                                                                                                   |
| frame          | Number of packets received incorrectly having a CRC error and a non-integer number of octets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| overrun        | Number of times the receiver hardware was unable to forward received data to a hardware buffer because the input rate exceeded the receiver’s ability to handle the data.                                                                                                                                                                                                                                                                                                                                                                                      |
| ignored        | Number of received packets ignored by the interface because the interface hardware ran low on internal buffers.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| packets output | Total number of messages sent by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| bytes          | Total number of bytes, including data and MAC encapsulation, sent by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| underruns      | Number of times the sender has been running faster than the receiving device can handle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| output errors  | Sum of all errors that prevented the final transmission of packets out of the interface being examined.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| collisions     | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



**Table 236** *show interface wideband-cable Field Descriptions*

| Field                     | Description                                                                                                                                                                                                                                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| interface resets          | Number of times an interface has been completely reset.                                                                                                                                                                                                                                                                 |
| output buffer failures    | Number of times the output buffer has failed.                                                                                                                                                                                                                                                                           |
| output buffer swapped out | Number of times the output buffer has been swapped out.                                                                                                                                                                                                                                                                 |
| sfid                      | Service flow identification number.                                                                                                                                                                                                                                                                                     |
| sid                       | Service identification number (upstream service flows only).                                                                                                                                                                                                                                                            |
| QoS Prov                  | QoS parameter index for the provisioned state of this flow.                                                                                                                                                                                                                                                             |
| Param Adm                 | QoS parameter index for the Admitted state of this flow.                                                                                                                                                                                                                                                                |
| Index Act                 | QoS parameter index for the Active state of this flow.                                                                                                                                                                                                                                                                  |
| Type                      | Indicates if the service flow is the primary flow or a secondary service flow. Secondary service flows are identified by an “S” (created statically at the time of registration, using the DOCSIS configuration file) or “D” (created dynamically by the exchange of dynamic service messages between the CM and CMTS). |
| Dir                       | Indicates if this service flow is downstream (DS) or upstream (US).                                                                                                                                                                                                                                                     |
| Curr State                | Current run-time state of the service flow.                                                                                                                                                                                                                                                                             |
| Active Time               | Length of time this service flow has been active.                                                                                                                                                                                                                                                                       |
| DS-ForwIf/US-BG/CH        | Bonding group ID or the downstream RFID of the forwarding interface assigned to the downstream service flow.                                                                                                                                                                                                            |

**Related Commands**

| Command                                    | Description                                                                 |
|--------------------------------------------|-----------------------------------------------------------------------------|
| <b>show interface cable downstream</b>     | Displays information about the downstream on the cable interface.           |
| <b>show interface cable sid</b>            | Displays information by service identifier (SID) of each CM on the network. |
| <b>show interface cable signal-quality</b> | Displays information about the cable signal quality.                        |
| <b>show interface cable upstream</b>       | Displays information about one or all upstreams on the cable interface.     |

# show interface wideband-cable multicast-sessions

To display information about multicast sessions on a specific wideband-cable interface, use the **show interface wideband-cable multicast-sessions** command in privileged EXEC mode.

```
show interface wideband-cable {slot/{subslot | bay}/port:wideband-channel}
 [group [ipv4-MQoS-group | ipv6-MQoS-group] | latency | sid [MQoS-sid]]
```

| Syntax Description                                                     |                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                                                            | Slot where the line card resides. <ul style="list-style-type: none"> <li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li> <li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> <li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li> </ul> |
| <i>subslot</i>                                                         | Subslot where a SIP resides. On the Cisco uBR10012 router, the subslot 0 is always specified.                                                                                                                                                                                |
| <i>bay</i>                                                             | Bay in a SIP where a SPA is located. The valid values are 0 (upper bay) and 1 (lower bay).                                                                                                                                                                                   |
| <i>port</i>                                                            | Downstream port number. <ul style="list-style-type: none"> <li>• Cisco uBR7246VXR router and Cisco uBR7225VXR router—The valid value is 0 or 1.</li> <li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>               |
| <i>wideband-channel</i>                                                | Wideband channel number. The valid range is from 0 to 11. On the Cisco uBR7246VXR and Cisco uBR7225VXR routers, the valid range is from 0 to 5.                                                                                                                              |
| <b>group</b><br>[ <i>ipv4-MQoS-group</i>  <br><i>ipv6-MQoS-group</i> ] | Displays information about the specified IPv4 or IPv6 multicast quality of service (MQoS) group.                                                                                                                                                                             |
| <b>latency</b>                                                         | Displays information about the multicast session latency.                                                                                                                                                                                                                    |
| <b>sid</b> [ <i>MQoS-sid</i> ]                                         | Displays information about the MQoS service identifier (SID). The value of the SID ranges from 8192 to 12272.                                                                                                                                                                |

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| Command History | Release     | Modification                                                                                                                                                                                                    |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. This command was modified to change the addressing format for a wideband cable interface from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |
|                 | 12.2(33)SCF | This command was modified. The <b>latency</b> keyword was added.                                                                                                                                                |

**Examples**

The following is a sample output from the **show interface wideband-cable multicast-sessions** command:

```
Router# show interface wideband-cable 1/0/0:0 multicast-sessions

Default Multicast Service Flow 3 on Wideband-Cable1/1/0:0
Multicast Group : 230.1.2.3
 Source : N/A
 Act GCRs : 1
 Interface : Bu1 State: A GI: Bu1 RC: 0

 GCR : GC SAID SFID Key GQC GEn
 1 8196 4 0 1 0
```

The following is a sample output from the **show interface wideband-cable multicast-sessions group** command:

```
Router# show interface wideband-cable 1/0/0:0 multicast-sessions group 230.1.2.3

Multicast Group : 230.1.2.3
 Source : N/A
 Act GCRs : 1
 Interface : Bu1 State: A GI: Bu1 RC: 0

 GCR : GC SAID SFID Key GQC GEn
 1 8196 4 0 1 0
```

The following is a sample output from the **show interface wideband-cable multicast-sessions latency** command:

```
Router# show interface wideband-cable 1/0/0:0 multicast-sessions latency

Session (S,G) : (*,230.1.2.3)
Fwd Intfc : Wi1/1/0:0
MQoS Entered at MQoS Exit at
Mar 6 23:13:12.383 Mar 6 23:13:12.383
GC SAID SFID SF req SF rsp
1 8196 4 Mar 6 23:13:12.383 Mar 6 23:13:12.387
```

The following is a sample output from the **show interface wideband-cable multicast-sessions sid** command:

```
Router# show interface wideband-cable 1/0/0:0 multicast-sessions sid 8196

Multicast Group : 230.1.2.3
 Source : N/A
 Act GCRs : 1
 Interface : Bu1 State: A GI: Bu1 RC: 0

 GCR : GC SAID SFID Key GQC GEn
 1 8196 4 0 1 0
```

 show interface wideband-cable multicast-sessions

| Related Commands | Command                                         | Description                                                                              |
|------------------|-------------------------------------------------|------------------------------------------------------------------------------------------|
|                  | show interface modular-cable multicast-sessions | Displays the information about multicast sessions on a specific modular-cable interface. |
|                  | show interface cable multicast-sessions         | Displays the information about the multicast sessions on a specific cable interface.     |
|                  | show interface wideband-cable                   | Displays the current configuration and status for a wideband channel.                    |

# show interface wideband-cable queue

To display the downstream hierarchical queueing framework (HQF) queue information for a wideband channel, use the **show interface wideband-cable queue** command in privileged EXEC mode.

**show interface wideband-cable** *slot/port:wideband-channel* [**queue** [**cblt** {*cblt-index* | **priority**}] | **pblt** | **verbose**]]

| Syntax Description      |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot/port</i>        | <ul style="list-style-type: none"> <li>Slot on the Cisco uBR7246VXR router. The valid values are: <ul style="list-style-type: none"> <li><i>slot</i>—3 to 6</li> <li><i>port</i>—0 or 1 (depending on the cable interface)</li> </ul> </li> <li>Slot on the Cisco uBR7225VXR router. The valid values are: <ul style="list-style-type: none"> <li><i>slot</i>—1 and 2</li> <li><i>port</i>—0 or 1 (depending on the cable interface)</li> </ul> </li> </ul> |
| <i>wideband-channel</i> | Wideband channel number. Valid values range from 0 to 7.                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>queue</b>            | (Optional) Displays downstream HQF queue information.                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>cblt</b>             | (Optional) Displays detailed class layer bandwidth limited traffic (CBLT) stream information for normal downstream HQF queues.                                                                                                                                                                                                                                                                                                                              |
| <i>cblt-index</i>       | CBLT index information.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>priority</b>         | Displays CBLT information for priority HQF queues. Priority queues do not have any indexes.                                                                                                                                                                                                                                                                                                                                                                 |
| <b>pblt</b>             | (Optional) Displays detailed physical layer bandwidth limited traffic (PBLT) stream information for normal HQF queues.                                                                                                                                                                                                                                                                                                                                      |
| <b>verbose</b>          | (Optional) Displays detailed information for all queues.                                                                                                                                                                                                                                                                                                                                                                                                    |

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                       |
|-----------------|-------------|------------------------------------------------------------------------------------|
|                 | 12.2(33)SCD | This command was introduced for the Cisco uBR7246VXR and Cisco uBR7225VXR routers. |

**Examples** The following is a sample output of the **show interface wideband-cable queue** command:

Router# **show interface wideband-cable 3/0:0 queue**

```

* idx/gqid Len/Limit Deqs Drops CIR MIR/PR SFID ForwInt
 pkts pkts pkts pkts kbps kbps
BE Queues:
I 0/1 0/128 700 0 0 0/0 C5/0:11 In5/0:0
 1/44 0/128 0 0 0 10000/0 C5/0:11 In5/0:0

```

## show interface wideband-cable queue

```

CIR Queues:
 33/97 0/128 1 14374 0 100 15000/0 C5/0:15 In5/0:0

Low Latency Queues:
~ 51/124 0/128 1 14374 0 100 100/0 C5/0:15 In5/0:0
$ 0/0 0/128 1 14374 0 100 100/0 - In5/0:0

```

The following is a sample output of the **show interface wideband-cable queue verbose** command:

```
Router# show interface wideband-cable 3/0:0 queue verbose
```

```
Interface Number 5 (type 25) Integrated Cable 3/0:0
OUTPUT FEATURES
```

```

 blt (0x63D90FA0, index 0, qid 0, fast_if_number 5) layer PHYSICAL
 scheduling policy: WFQ (111)
 classification policy: CLASS_BASED (122)
 drop policy: TAIL (141)
 packet size fixup policy: NONE (0) no of global policers: 0
 blt flags: 0x220000 scheduler: 0x63DFDBE0
 total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 0 total
active 0

 txcount 26131 txqbytes 2030784 drops 0 qdrops 0 nobuffers 0 flowdrops 0
 qsize 0 aggregate limit/bytes 1000/0 availbuffers 1000
 holdqueue_out 1000 perc 0.00 remaining_ratio/perc 0
 visible_bw 37500 max_rate 37500 allocated_bw 37500 vc_encap 0 ecn_threshold NONE
 weight A 1 quantum A 1500 credit A 1500
 weight B 1 quantum B 1500 credit B 1500
 min-rate tokens: 13000, credit: 0, depth: 13000

 backpressure_policy 0 scheduler_flags C03B
 last_sortq[A/B] 0/0, remaining pak/particles 0/0
 leaf_blt[P1] 0x63DFDBE0 burst packets/bytes[P1] 0/0
 leaf_blt[P2] 0x63DFDBE0 burst packets/bytes[P2] 0/0
 leaf_blt[NOTP] 0x63DFDBE0 burst packets/bytes[NOTP] 0/0
(max entries 1000)

 next layer HQFLAYER_CLASS_HIERO (max entries 1000)

 blt (0x63D90EE0, index 0, qid 1, fast_if_number 5) layer CLASS_HIERO
 scheduling policy: FIFO (110)
 classification policy: NONE (120)
 drop policy: TAIL (141)
 packet size fixup policy: NONE (0) no of global policers: 0
 blt flags: 0x220000 scheduler: 0x63DFDB20
 total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 0 total
active 1

 txcount 167 txqbytes 12912 drops 0 qdrops 0 nobuffers 0 flowdrops 0
 qsize 0 aggregate limit/bytes 1000/0 availbuffers 1000
 holdqueue_out 0 perc 100.00 remaining_ratio/perc 0
 visible_bw 37500 max_rate 37500 allocated_bw 37500 vc_encap 0 ecn_threshold NONE
 weight A 1 quantum A 1500 credit A 1500
 weight B 1 quantum B 1500 credit B 1500
 min-rate tokens: 18750, credit: 0, depth: 18750

 backpressure_policy 0 scheduler_flags C03B
 last_sortq[A/B] 55/11, remaining pak/particles 0/0
 leaf_blt[P1] 0x63DFDB20 burst packets/bytes[P1] 0/0
 leaf_blt[P2] 0x63DFDB20 burst packets/bytes[P2] 0/0
 leaf_blt[NOTP] 0x63DFDB20 burst packets/bytes[NOTP] 1/80

```

The following is a sample output of the **show interface wideband-cable queue cblt cblt-index** command:

```
Router# show interface wideband-cable 3/0:0 queue cblt 1

blt (0x65CE3EA0, index 1, qid 45, fast_if_number 19) layer CLASS_HIER0
scheduling policy: FIFO (110)
classification policy: NONE (120)
drop policy: TAIL (141)
packet size fixup policy: NONE (0) no of global policers: 0
D/Traffic Shaping enabled
blt flags: 0x22A208C scheduler: 0x65D504C0
total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 1000 total
active 1
D/Traffic Shaping enabled
txcount 890 txqbytes 63900 drops 0 qdrops 0 nobuffers 0 flowdrops 0
qsize 0 aggregate limit/bytes 128/100000 availbuffers 128
holdqueue_out 0 perc 0.00 remaining_ratio/perc 11
visible_bw 0 max_rate 4000 allocated_bw 0 vc_encap 0 ecn_threshold NONE
weight A 1 quantum A 1500 credit A 1500
weight B 1 quantum B 1500 credit B 1500
min-rate tokens: 1500, credit: 0, depth: 1500

backpressure_policy 0 scheduler_flags C03F
last_sortq[A/B] 0/0, remaining pak/particles 0/0
leaf_blt[P1] 0x65D504C0 burst packets/bytes[P1] 0/0
leaf_blt[P2] 0x65D504C0 burst packets/bytes[P2] 0/0
leaf_blt[NOTP] 0x65D504C0 burst packets/bytes[NOTP] 0/0

OUTPUT Shaping
Bc internal 0 Be internal 0 Time interval 4
increment 4000 increment_lower 0 increment_limit 4000
last visit 87456736 credit 0 outstanding_tokens 23760 maxtokens 24352
peak_rate_credit 0 peak_rate_tokens 0 peak_rate_increment 0
system timer delayed 0 restart timer 0
timer set 0 hqf_shape_running 17254
nextexpire_system_time 0 nextexpire_time_qindex -1
```

The following is a sample output of the **show interface wideband-cable queue cblt priority** command:

```
Router# show interface wideband-cable 3/0:0 queue cblt priority

blt (0x19FA9300, index 0, qid 52, fast_if_number 20) layer CLASS_HIER0
scheduling policy: FIFO (110)
classification policy: NONE (120)
drop policy: TAIL (141)
packet size fixup policy: NONE (0) no of global policers: 0
blt flags: 0x200800 scheduler: 0x1A015CC0
total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 9500 total
active 1

txcount 114 txqbytes 12864 drops 0 qdrops 0 nobuffers 0 flowdrops 0
qsize 0 aggregate limit/bytes 128/0 availbuffers 128
holdqueue_out 0 perc 0.00 remaining_ratio/perc 0
visible_bw 0 max_rate 37500 allocated_bw 0 vc_encap 0 ecn_threshold NONE
weight A 1 quantum A 1500 credit A 1500
weight B 1 quantum B 1500 credit B 1500
min-rate tokens: 1500, credit: 0, depth: 1500

backpressure_policy 0 scheduler_flags C83F
last_sortq[A/B] 0/0, remaining pak/particles 0/0
leaf_blt[P1] 0x1A015CC0 burst packets/bytes[P1] 0/0
```

**show interface wideband-cable queue**

```

leaf_blt[P2] 0x1A015CC0 burst packets/bytes[P2] 0/0
leaf_blt[NOTP] 0x1A015CC0 burst packets/bytes[NOTP] 0/0

PRIORITY LEVEL 1: total bandwidth 500 kbps, total percent 0%

```

The following is a sample output of the **show interface wideband-cable queue pblt** command:

Router# **show interface wideband-cable 3/0:0 queue pblt**

```

blt (0x19FB4700, index 0, qid 0, fast_if_number 20) layer PHYSICAL
scheduling policy: WFQ (111)
classification policy: CLASS_BASED (122)
drop policy: TAIL (141)
packet size fixup policy: NONE (0) no of global policers: 0
blt flags: 0x220000 scheduler: 0x1A0210C0
total guarantee percent 0 total remaining perc 0 total bandwidth guarantee 0 total
active 0

txcount 67743 txqbytes 6281007 drops 2 qdrops 0 nobuffers 0 flowdrops 0
qsize 0 aggregate limit/bytes 8000/0 availbuffers 8000
holdqueue_out 1000 perc 0.00 remaining_ratio/perc 0
visible_bw 37500 max_rate 37500 allocated_bw 18000 vc_encap 0 ecn_threshold NONE
weight A 1 quantum A 1500 credit A 1500
weight B 1 quantum B 1500 credit B 1500
min-rate tokens: 13000, credit: 0, depth: 13000

backpressure_policy 1 scheduler_flags C03F
last_sortq[A/B] 0/0, remaining pak/particles 0/0
leaf_blt[P1] 0x1A0210C0 burst packets/bytes[P1] 0/0
leaf_blt[P2] 0x1A0210C0 burst packets/bytes[P2] 0/0
leaf_blt[NOTP] 0x1A0210C0 burst packets/bytes[NOTP] 0/0

```

[Table 237](#) describes the fields shown in the **show interface wideband-cable queue** command display.

**Table 237** *show interface wideband-cable queue Field Descriptions*

| Field              | Description                        |
|--------------------|------------------------------------|
| Len/Limit Pkts     | Queue length and limit in packets. |
| Deqs Pkts          | Dequeue packets                    |
| Drops Pkts         | Dropped packets.                   |
| CIR Kbps           | Committed information rate.        |
| MIR/PR Kbps        | Maximum information and peak rate. |
| Forwint            | Forwarding interface.              |
| BE Queues          | Best effort queues.                |
| CIR Queues         | Committed information rate queues. |
| Low Latency Queues | Low latency queues.                |

**Related Commands**

| Command                     | Description                                                 |
|-----------------------------|-------------------------------------------------------------|
| <b>show interface cable</b> | Displays the configuration and status of a cable interface. |



| Command                              | Description                                                         |
|--------------------------------------|---------------------------------------------------------------------|
| <b>show interface modular-cable</b>  | Displays the configuration and status of a modular cable interface. |
| <b>show interface wideband-cable</b> | Displays the configuration and status of a wideband channel.        |

# show interfaces cable-modem

To display information about the cable interface, use the **show interfaces cable-modem** command in privileged EXEC mode.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show interfaces cable-modem** *number* [**accounting** | **counters** | **crb** | **irb** | **type**]

| Syntax Description |                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>number</b>      | Identifies the cable interface (always <b>0</b> ).                                                                                                                                                                                                                                                                                                                                                        |
| <b>accounting</b>  | (Optional) Displays the number of packets of each protocol type that has been sent through the router interface.                                                                                                                                                                                                                                                                                          |
| <b>counters</b>    | (Optional) Shows MIB counters on the cable interface.                                                                                                                                                                                                                                                                                                                                                     |
| <b>crb</b>         | (Optional) Displays concurrent routing and bridging information for each interface that has been configured for routing or bridging. This option does not really apply to the router but is included because it is part of the subsystem that provides DOCSIS-compliant bridging. For more information, see the <a href="#">Cisco IOS Bridging and IBM Networking Configuration Guide, Release 12.2</a> . |
| <b>irb</b>         | (Optional) Displays integrated routing and bridging information for each interface that has been configured for routing or bridging. This option does not really apply to the router but is included because it is part of the subsystem that provides DOCSIS-compliant bridging. For more information, see the <a href="#">Cisco IOS Bridging and IBM Networking Configuration Guide, Release 12.2</a> . |
| <b>type</b>        | (Optional) Designed to display information about virtual LANs associated with the interface; however, this option is not supported on the router.                                                                                                                                                                                                                                                         |

|                 |                                                                                                             |
|-----------------|-------------------------------------------------------------------------------------------------------------|
| <b>Defaults</b> | When this command is entered without a keyword, general information about the cable interface is displayed. |
|-----------------|-------------------------------------------------------------------------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| Command History | Release    | Modification                                                          |
|-----------------|------------|-----------------------------------------------------------------------|
|                 | 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router. |
|                 | 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.           |
|                 | 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.           |
|                 | 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                 | 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.           |

|                 |                                                                                                                   |
|-----------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows typical output for the cable interface when traffic is passing through the interface: |
|-----------------|-------------------------------------------------------------------------------------------------------------------|

```
Router# show interfaces cable-modem 0
```

```

cable-modem0 is up, line protocol is up
Hardware is BCM3300, address is 0050.7366.2439 (bia 0050.7366.2439)
Internet address is 5.2.0.11/16
MTU 1500 bytes, BW 27000 Kbit, DLY 1000 usec,
 reliability 255/255, txload 1/255, rxload 1/255
Encapsulation DOCSIS, loopback not set
Keepalive set (10 sec)
ARP type:ARPA, ARP Timeout 04:00:00
Last input 00:00:00, output 00:00:00, output hang never
Last clearing of "show interface" counters 00:08:40
Queueing strategy:fifo
Output queue 40/40, 52787 drops; input queue 0/75, 0 drops
5 minute input rate 2000 bits/sec, 2 packets/sec
5 minute output rate 94000 bits/sec, 154 packets/sec
 1074 packets input, 418472 bytes, 0 no buffer
 Received 19 broadcasts, 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 78771 packets output, 6326786 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 output buffer failures, 0 output buffers swapped out

```

Router#

Table 0-238 describes the significant fields shown in the display.

**Table 0-238** *show interfaces cable-modem Field Descriptions*

| Field                            | Description                                                                                                                                                                                                                                                                             |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cable-modem0 is up               | Indicates that the interface is currently active. “Disabled” indicates the interface has received more than 5000 errors in one keepalive interval (10 seconds by default if keepalive is set); “administratively down” indicates the interface has been taken down by an administrator. |
| line protocol is up              | Indicates that the software processes that handle the line protocol believe the interface is usable.                                                                                                                                                                                    |
| Hardware                         | Hardware type and MAC address.                                                                                                                                                                                                                                                          |
| Internet address                 | Internet address followed by the shorthand notation for the subnet mask.                                                                                                                                                                                                                |
| MTU                              | Maximum Transmission Unit (equivalent of the maximum packet size) for the interface.                                                                                                                                                                                                    |
| BW                               | Bandwidth of the interface in kilobits per second.                                                                                                                                                                                                                                      |
| DLY                              | Delay of the interface in microseconds.                                                                                                                                                                                                                                                 |
| reliability                      | Reliability of the interface, expressed as a fraction of 255, calculated as an exponential average over a 5-minute period. (255/255 equals 100% reliability.)                                                                                                                           |
| tx load/rx load                  | Load on the interface caused by transmitting and receiving, expressed as a fraction of 255, calculated as an exponential average over a 5-minute period.                                                                                                                                |
| Encapsulation/loopback/keepalive | Encapsulation method assigned to the interface.                                                                                                                                                                                                                                         |
| loopback                         | Indicates whether or not loopback is set.                                                                                                                                                                                                                                               |
| keepalive                        | Indicates whether or not keepalives are set.                                                                                                                                                                                                                                            |

**Table 0-238** *show interfaces cable-modem Field Descriptions (continued)*

| Field                                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ARP type                                    | Type of Address Resolution Protocol configured for the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| ARP Timeout                                 | Number of hours, minutes, and seconds an ARP cache entry will stay in the cache.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Last input/output                           | Number of hours, minutes, and seconds since the last packet was successfully received/transmitted by the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| output hang                                 | Number of hours, minutes, and seconds since the interface was last reset because of a transmission that took too long. When the number of hours in any of the “Last...” fields exceeds 24, the number of days and hours is displayed. If the field overflows, asterisks are printed.                                                                                                                                                                                                                                                                                                                                         |
| Last clearing of “show interface” counters  | Time at which the counters that measure cumulative statistics (such as number of bytes transmitted and received) shown in this report were last reset to zero. Note that variables that might affect routing (for example, load and reliability) are not cleared when the counters are cleared.<br><br>*** indicates the elapsed time is too large to be displayed.<br>0:00:00 indicates the counters were cleared more than $2^{31}$ milliseconds (and less than $2^{32}$ milliseconds) ago.                                                                                                                                |
| Queueing strategy                           | Type of queueing strategy in effect on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Output queue/drops                          | Number of packets in the output queue followed by the size of the queue and the number of packets dropped due to a full queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| input queue/drops                           | Number of packets in the input queue followed by the size of the queue and the number of packets dropped due to a full queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 5 minute input rate<br>5 minute output rate | Average number of bits and packets received and transmitted per second in the last 5 minutes. If the interface is not in promiscuous mode, it senses network traffic it sends and receives (rather than all network traffic).<br><br>The 5-minute input and output rates should be used only as an approximation of traffic per second during a given 5-minute period. These rates are exponentially weighted averages with a time constant of 5 minutes. A period of four time constants must pass before the average will be within two percent of the instantaneous rate of a uniform stream of traffic over that period. |
| packets input                               | Total number of error-free packets received by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| bytes                                       | Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| no buffer                                   | Number of received packets discarded because there was no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernet networks and bursts of noise on serial lines are often responsible for no input buffer events.                                                                                                                                                                                                                                                                                                                                                                           |

**Table 0-238**     *show interfaces cable-modem Field Descriptions (continued)*

| Field               | Description                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Received broadcasts | Total number of broadcast or multicast packets received by the interface.                                                                                                                                                                                                                                                                                                         |
| runts               | Number of packets discarded because they were smaller than the medium's minimum packet size. For example, any Ethernet packet less than 64 bytes is considered a runt.                                                                                                                                                                                                            |
| giants              | Number of packets discarded because they were larger than the medium's maximum packet size. For example, any Ethernet packet larger than 1518 bytes is considered a giant.                                                                                                                                                                                                        |
| throttles           | Number of times the receiver on the port was disabled, possibly due to buffer or processor overload.                                                                                                                                                                                                                                                                              |
| input errors        | Includes runts, giants, no buffer, CRC, frame, overrun, and ignored counts. Other input-related errors can also cause the input errors count to be increased, and some datagrams may have more than one error; therefore, this sum may not balance with the sum of enumerated input error counts.                                                                                 |
| CRC                 | Number of cyclic redundancy checks (CRCs) generated by the originating LAN station or far-end device that do not match the checksum calculated from the data received. On a LAN, this field usually indicates noise or transmission problems on the LAN interface or the LAN bus itself. A high number of CRCs is usually the result of collisions or a station sending bad data. |
| frame               | Number of packets received incorrectly, having a CRC error and a noninteger number of octets. On a LAN, this value is usually the result of collisions or a malfunctioning Ethernet device.                                                                                                                                                                                       |
| overrun             | Number of times the receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.                                                                                                                                                                                                            |
| ignored             | Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different from the system buffers mentioned previously in the buffer description. Broadcast storms and bursts of noise can cause the ignored count to be increased.                                                                             |
| abort               | Number of packets whose receipt was aborted.                                                                                                                                                                                                                                                                                                                                      |
| packets output      | Total number of messages sent by the system.                                                                                                                                                                                                                                                                                                                                      |
| bytes               | Total number of bytes, including data and MAC encapsulation, sent by the system.                                                                                                                                                                                                                                                                                                  |
| underruns           | Number of times the transmitter has been running faster than the router can handle.                                                                                                                                                                                                                                                                                               |
| output errors       | Sum of all errors that prevented the final transmission of datagrams out of the interface being examined. Note that this may not balance with the sum of the enumerated output errors, as some datagrams might have more than one error, and others might have errors that do not fall into any of the specifically tabulated categories.                                         |

**Table 0-238** *show interfaces cable-modem Field Descriptions (continued)*

| Field                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| collisions                 | Number of messages retransmitted due to an Ethernet collision. Collisions are usually the result of an overextended LAN (Ethernet or transceiver cable too long, more than two repeaters between stations, or too many cascaded multiport transceivers). A packet that collides is counted only once in output packets.                                                                                                                                                                                                                                   |
| interface resets           | Number of times an interface has been completely reset. A reset can happen if packets queued for transmission were not sent within several seconds. On a serial line, this can be caused by a malfunctioning modem that is not supplying the transmit clock signal, or by a cable problem. If the system notices that the carrier detect line of a serial interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an interface is looped back or shut down. |
| output buffer failures     | Number of times the output buffer has failed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| output buffers swapped out | Number of times the output buffer has been swapped out.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

The following example shows typical output of the **show interfaces cable-modem accounting** command, which shows the number of packets and bytes of each protocol type that is passing through the cable interface:

```
Router# show interfaces cable-modem 0 accounting

cable-modem0
 Protocol Pkts In Chars In Pkts Out Chars Out
 IP 545 185502 159 90240
 Trans. Bridge 3878 964995 12597 1611142
 ARP 73 3066 86 4128

Router#
```

[Table 0-239](#) describes the significant fields shown in this display.

**Table 0-239** *show interfaces cable-modem accounting Field Descriptions*

| Field     | Description                                                   |
|-----------|---------------------------------------------------------------|
| Protocol  | List of protocols operating on the cable-modem interface.     |
| Pkts In   | Number of packets of each protocol received on the interface. |
| Chars In  | Number of bytes of each protocol received on the interface.   |
| Pkts Out  | Number of packets of each protocol sent on the interface.     |
| Chars Out | Number of bytes of cache protocol sent on the interface.      |

The following example shows typical output for the **show interfaces cable-modem counters** command:

```
Router# show interfaces cable-modem 0 counters

Cable specific counters:
Ranging requests sent : 50982
Downstream FIFO full : 0
Re-requests : 7277
```

```

DS MAC Message Overruns: 0
DS Data Overruns : 0
Received MAPs : 254339485
Received Syncs : 53059555
Message CRC failures : 0
Header CRC failures : 1394
Data PDUs : 5853
DS MAC messages : 307861745
Valid Headers : 307869065
Sync losses : 0
Pulse losses : 1
BW request failures : 6

```

Router#

Table 0-240 describes the counters shown in this display.

**Table 0-240**      **Counters Shown in show interfaces cable-modem counters Display**

| Field                   | Description                                                                                                                                                                                              |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ranging requests sent   | Number of ranging requests sent by the router to the CMTS.                                                                                                                                               |
| Downstream FIFO full    | Number of times the downstream input first-in first-out (FIFO) buffer became full on the router.                                                                                                         |
| Re-requests             | Number of times a bandwidth request generated by the router was not responded to by the CMTS.                                                                                                            |
| DS MAC Message Overruns | Number of times the DMA controller had a downstream MAC message and there were no free MAC message buffer descriptors to accept the message.                                                             |
| DS Data Overruns        | Number of times the DMA controller had downstream data and there were no free data PDU buffer descriptors to accept the data.                                                                            |
| Received MAPs           | Number of times a MAP message passed all filtering requirements and was received by the router.                                                                                                          |
| Received Syncs          | Number of times a time-stamp message was received by the router.                                                                                                                                         |
| Message CRC failures    | Number of times a MAC message failed a cyclic redundancy check (CRC).                                                                                                                                    |
| Header CRC failures     | Number of times a MAC header failed its 16-bit CRC check. The MAC header CRC is a 16-bit Header Check Sequence (HCS) field that ensures the integrity of the MAC header even in a collision environment. |
| Data PDUs               | Total number of data PDUs (protocol data units) of all types received by the router.                                                                                                                     |
| DS MAC messages         | Number of MAC messages received by the router.                                                                                                                                                           |
| Valid Headers           | Number of valid headers received by the router, including PDU headers, MAC headers, and headers only.                                                                                                    |
| Sync losses             | Number of times the router lost timebase sync with the CMTS.                                                                                                                                             |
| Pulse losses            | Number of times the router did not receive expected timestamp messages from the CMTS.                                                                                                                    |
| BW request failures     | Number of times the router sent the maximum number of re-requests for bandwidth allocation and the request was still not granted.                                                                        |

## show interfaces cable-modem

The following example shows typical output for the **show interfaces cable-modem crb** command, which displays information about the bridging and routing protocols being used on the cable interface:

```
Router# show interfaces cable-modem 0 crb

cable-modem0

Bridged protocols on cable-modem0:
ip

Software MAC address filter on cable-modem0
Hash Len Address Matches Act Type
0x00: 0 ffff.ffff.ffff 3877 RCV Physical broadcast
0x2A: 0 0900.2b01.0001 0 RCV DEC spanning tree
0x7A: 0 0010.7b43.aa01 573 RCV Interface MAC address
0xC2: 0 0180.c200.0000 0 RCV IEEE spanning tree
0xC2: 1 0180.c200.0000 0 RCV IBM spanning tree
Router#
```

Table 0-241 describes the fields shown in this display.

**Table 0-241** *show interfaces cable-modem crb Field Descriptions*

| Field   | Description                                                                                      |
|---------|--------------------------------------------------------------------------------------------------|
| Hash    | Hash key/relative position in the keyed list for this MAC address filter.                        |
| Len     | Length of this entry to the beginning element of this hash chain.                                |
| Address | Canonical (Ethernet ordered) MAC address of this filter.                                         |
| Matches | Number of received packets that match this MAC address.                                          |
| Act     | Action to be taken when this address is looked up; choices are to receive or discard the packet. |
| Type    | MAC address type.                                                                                |



### Tip

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

### Related Commands

| Command                        | Description                                            |
|--------------------------------|--------------------------------------------------------|
| <b>show bridge cable-modem</b> | Displays bridging information for the cable interface. |



# show ip arp vrf

To view which virtual routing and forwarding (VRF) instance contains a specific cable modem in the Address Resolution Protocol (ARP) cache table, use the **show ip arp vrf** command in privileged EXEC mode.

**show ip arp vrf** *WORD*

| Syntax Description | <i>WORD</i> | VRF name. |
|--------------------|-------------|-----------|
|--------------------|-------------|-----------|

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

**Examples** The following is sample output from the **show ip arp vrf** command:

Router # **show ip arp vrf** vrfa

| Protocol | Address      | Age (min) | Hardware Addr  | Type | Interface         |
|----------|--------------|-----------|----------------|------|-------------------|
| Internet | 203.0.113.1  | 0         | 0018.742c.6e00 | ARPA | FastEthernet0/0/0 |
| Internet | 203.0.113.2  | -         | 0014.f1e4.fb58 | ARPA | FastEthernet0/0/0 |
| Internet | 198.51.100.1 | -         | 0014.f1e4.fc31 | ARPA | Bundle1.2         |
| Internet | 198.51.100.2 | 0         | 001e.6bfb.34e8 | ARPA | Bundle1.2         |
| Internet | 198.51.100.3 | 0         | 0007.0e07.9f1f | ARPA | Bundle1.2         |
| Internet | 198.51.100.5 | 0         | 0025.2eaf.6bea | ARPA | Bundle1.2         |
| Internet | 198.51.100.6 | 0         | 001a.c3ff.d1a4 | ARPA | Bundle1.2         |
| Internet | 198.51.100.7 | 0         | 001e.6bfb.1c7e | ARPA | Bundle1.2         |

[Table 1](#) describes the significant fields shown in the display.

**Table 242** *show ip arp vrf Field Descriptions*

| Field         | Description                                                                                                                                                   |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Protocol      | Protocol for network address in the Address field.                                                                                                            |
| Address       | The network address that corresponds to the IPv4 address.                                                                                                     |
| Age (min)     | Age of the cache entry (in minutes). A hyphen (-) means the address is local.                                                                                 |
| Hardware Addr | LAN hardware address of a MAC address that corresponds to the network address.                                                                                |
| Type          | Encapsulation type for the network address. The valid values include: <ul style="list-style-type: none"> <li>• ARPA</li> <li>• SNAP</li> <li>• SAP</li> </ul> |
| Interface     | Interface associated with the specified network address.                                                                                                      |

 show ip arp vrf**Related Commands**

| Command                                   | Description                                                                            |
|-------------------------------------------|----------------------------------------------------------------------------------------|
| <b>cable source-route</b>                 | Configures the VRF source route on the cable modem in subinterface configuration mode. |
| <b>cable vrf-steering<br/>cable-modem</b> | Steers or directs the cable modems to the specified VRF.                               |
| <b>ip vrf</b>                             | Defines a VRF instance and enters the interface configuration mode.                    |

# show ip interface brief

To display a brief summary of an interface's IP information and status, to include virtual interface bundle information, use the **show ip interface brief** command in privileged EXEC mode.

**show ip interface brief**

## Syntax Description

This command has no additional keywords or arguments.

## Command Default

Virtual Interface Bundling is enabled by default in Cisco IOS Release 12.3(21)BC and later releases.

## Command Modes

Privileged EXEC

## Command History

| Release    | Modification                                                                                                                 |
|------------|------------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC | Support was added for virtual interface bundling configured with upgrade to Cisco IOS Release 12.3(21)BC and later releases. |

## Usage Guidelines

Refer to the following document on Cisco.com for additional information about cable interface bundling and virtual interface bundling on the Cisco CMTS:

- *Cable Interface Bundling and Virtual Interface Bundling on the Cisco CMTS*

## Examples

The following example illustrates a virtual interface bundle with the **show ip interface brief** command:

```
Router# show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0/0 1.8.44.1 YES NVRAM up up
POS1/0/0 unassigned YES NVRAM up up
GigabitEthernet2/0/0 11.0.0.2 YES NVRAM up up
GigabitEthernet3/0/0 10.1.1.101 YES NVRAM up up
GigabitEthernet4/0/0 1.1.1.1 YES NVRAM down down
Cable8/1/0 unassigned YES NVRAM up up
Cable8/1/1 unassigned YES NVRAM up up
Cable8/1/2 unassigned YES NVRAM up up
Cable8/1/3 unassigned YES NVRAM up up
Cable8/1/4 unassigned YES NVRAM up up
Bundle1 10.44.50.1 YES TFTP up up
Router#
```

## Related Commands

| Command             | Description                                                                                |
|---------------------|--------------------------------------------------------------------------------------------|
| <b>cable bundle</b> | Configures a cable interface to belong to an interface bundle or virtual interface bundle. |
| <b>show arp</b>     | Displays the entries in the router's ARP table.                                            |

| Command                                          | Description                                                                                                                                                                        |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>show cable bundle number forwarding-table</b> | Displays the MAC forwarding table for the specified bundle, showing the MAC addresses of each cable modem in a bundle and the physical cable interface that it is currently using. |
| <b>show cable modem</b>                          | Displays the cable modems that are online both before and after cable interface bundling has been configured.                                                                      |
| <b>show running-config interface cable</b>       | Displays the configuration for the specified cable interface.                                                                                                                      |

# show ipdr collector

To display the list of sessions that the Collector is associated, use the **show ipdr collector** command in the privileged EXEC mode.

**show ipdr collector** *collector\_name*

| Syntax Description | <i>collector_name</i> | The name of the Collector. |
|--------------------|-----------------------|----------------------------|
|--------------------|-----------------------|----------------------------|

| Command Default | No default behavior or values. |
|-----------------|--------------------------------|
|-----------------|--------------------------------|

| Command Modes | Privileged EXEC mode |
|---------------|----------------------|
|---------------|----------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

| Usage Guidelines | The <b>show ipdr collector</b> command displays the collector information, message statistics and event for all the sessions that are associated with the collector . |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Examples | The following example shows the sample output for the <b>show ipdr collector</b> command. |
|----------|-------------------------------------------------------------------------------------------|
|----------|-------------------------------------------------------------------------------------------|

```
Router#configure terminal
Router#show ipdr collector federal
Collector Name: federal, IP: 192.0.2.0, Port: 0
2001-07-05T19:28:22 Collector in session 1 Statistics:
 Transmitted 12658 Acknowledged 12658 Enqueued 12658 Lost 0
 Last Event: Event Id 1 IPDR_EVENT_SERVER_CONNECTED - INCOMING
Router(config)#
```

| Related Commands | Command                   | Description                                                              |
|------------------|---------------------------|--------------------------------------------------------------------------|
|                  | <b>show ipdr exporter</b> | Displays information about the IPDR Exporter state.                      |
|                  | <b>ipdr collector</b>     | Configures the Internet Protocol Detail Record (IPDR) Collector details. |

# show ipdr exporter

To display information about the state of the IPDR Exporter, use the **show ipdr exporter** command in the privileged EXEC mode.

## show ipdr exporter

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no keywords or arguments. |
|---------------------------|--------------------------------------------|

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Privileged EXEC mode |
|----------------------|----------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCB    | This command was introduced. |

|                         |                                                                                                                                                                          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>show ipdr exporter</b> command displays information about the IPDR Exporter state. The information displayed indicates the Exporter states that are listed below. |
|                         | <ul style="list-style-type: none"><li>• started</li><li>• not started</li><li>• not initialized</li></ul>                                                                |

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows the sample output for the <b>show ipdr exporter</b> command. |
|-----------------|------------------------------------------------------------------------------------------|

|                                                                                          |
|------------------------------------------------------------------------------------------|
| <pre>Router#configure terminal Router#show ipdr exporter IPDR exporter is started.</pre> |
|------------------------------------------------------------------------------------------|

|                         |                            |                                                                                                                               |
|-------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>             | <b>Description</b>                                                                                                            |
|                         | <b>show ipdr collector</b> | Displays the collector information, message statistics and event for all the sessions that are associated with the collector. |
|                         | <b>ipdr exporter start</b> | Starts the IPDR Exporter and connects to the collector.                                                                       |

# show ipdr session

To display the list of sessions and session details, use the **show ipdr session** command in the privileged EXEC mode.

**show ipdr session** {*all* | *session\_id*}

## Syntax Description

|                   |                                                                                                                      |
|-------------------|----------------------------------------------------------------------------------------------------------------------|
| <i>all</i>        | Displays all the associated sessions and session details such as the session ID, description, and the session state. |
| <i>session_id</i> | Displays session details for a specific session ID. The valid range is 1 to 255.                                     |

## Command Default

No default behavior or values.

## Command Modes

Privileged EXEC mode

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

The **show ipdr session** command displays the session details such as the session ID, description, and the session state for all sessions as well as for a specific session.

## Examples

The following example shows the sample output for the *all* option for the **show ipdr session** command.

```
Router#configure terminal
Router#show ipdr session all
Session ID: 1, Name: utilsta, Descr: test, Started: False
```

The following example shows the sample output for the *session\_id* option for the **show ipdr session** command.

```
Router#configure terminal
Router#show ipdr session 1
Session ID: 1, Name: utilsta, Descr: test, Started: False
```

2001-07-05T19:36:28 Statistics:

Transmitted 0 Acknowledged 0 Enqueued 0 Lost 0  
queuedOutstanding 0 queuedUnacknowledged 0

1 Collectors in the session:

Name: federal, IPAddr: 192.0.2.0, Port: 0, Priority: 1

## Related Commands

| Command                    | Description                                                              |
|----------------------------|--------------------------------------------------------------------------|
| <b>show ipdr exporter</b>  | Displays information about the IPDR Exporter state.                      |
| <b>ipdr collector</b>      | Configures the Internet Protocol Detail Record (IPDR) Collector details. |
| <b>ipdr session</b>        | Adds a session to the IPDR Exporter.                                     |
| <b>ipdr exporter start</b> | Starts the IPDR Exporter and connects to the collector.                  |



# show ipdr session collector

To display the details of a collector that is associated with a specific session, use the **show ipdr session collector** command in the privileged EXEC mode.

**show ipdr session** *session\_id* **collector** *collector\_name*

## Syntax Description

|                       |                                                   |
|-----------------------|---------------------------------------------------|
| <i>session_id</i>     | The IPDR session ID. The valid range is 1 to 255. |
| <i>collector_name</i> | The name of the Collector.                        |

## Command Default

No default behavior or values.

## Command Modes

Privileged EXEC mode

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

The **show ipdr session collector** command displays the details of a collector that is associated with a specific session. Since there can be multiple collectors associated to a session, this command is used to show a specific session-collector pair.

## Examples

The following example shows the sample output for the **show ipdr session collector** command.

```
Router#configure terminal
Router#show ipdr session 1 collector federal
Session ID: 1, Name: utilsta, Descr: test, Started: False
Collecotr Name: federal, IP: 192.0.2.0, Port: 0

2001-07-05T19:38:02 Collector in session 1 Statistics:
 Transmitted 0 Acknowledged 0 Enqueued 0 Lost 0
 Last Event: Event Id 0 WRONG_EVENT_ID
```

## Related Commands

| Command                    | Description                                                     |
|----------------------------|-----------------------------------------------------------------|
| <b>show ipdr session</b>   | Displays the list of sessions and session details.              |
| <b>show ipdr collector</b> | Displays the list of sessions that the Collector is associated. |
| <b>ipdr session</b>        | Adds a session to the IPDR Exporter.                            |

# show ipdr session template

To display the list of all active templates supported by a specific session, use the **show ipdr session template** command in the privileged EXEC mode.

**show ipdr session *session\_id* template**

|                    |                   |                                                   |
|--------------------|-------------------|---------------------------------------------------|
| Syntax Description | <i>session_id</i> | The IPDR session ID. The valid range is 1 to 255. |
|--------------------|-------------------|---------------------------------------------------|

|                 |                                |
|-----------------|--------------------------------|
| Command Default | No default behavior or values. |
|-----------------|--------------------------------|

|               |                      |
|---------------|----------------------|
| Command Modes | Privileged EXEC mode |
|---------------|----------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

|                  |                                                                                                                          |
|------------------|--------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>show ipdr session template</b> command displays the list of all active templates supported by a specific session. |
|------------------|--------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                                                              |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows the sample output for the <b>show ipdr session template</b> command.</p> <pre>Router#configure terminal Router#show ipdr session 1 template Template ID: 2, Name: , Type: DOCSIS-Type, KeyNumber: 22 Session 1 has totally 1 templates.</pre> |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                  | Description                                        |
|------------------|--------------------------|----------------------------------------------------|
|                  | <b>show ipdr session</b> | Displays the list of sessions and session details. |
|                  | <b>ipdr template</b>     | Adds an IPDR template to the IPDR Session.         |
|                  | <b>ipdr session</b>      | Adds a session to the IPDR Exporter.               |



## Cable Commands: show m through show z

Revised: May 27, 2013, OL-15510-16

### New Commands

| Command                              | Cisco IOS Software Release |
|--------------------------------------|----------------------------|
| show pxf cable controller            | 12.3(23)BC1                |
| show pxf cpu queue wb-spa            | 12.3(23)BC                 |
| show redundancy config-sync          | 12.2(33)SCA                |
| show redundancy platform             | 12.2(33)SCA                |
| show pxf cable multicast             | 12.2(33)SCB                |
| show pxf cpu drl-trusted-site        | 12.2(33)SCB                |
| show packetcable gate ipv6           | 12.2(33)SCE                |
| show packetcable gate multimedia     | 12.2(33)SCE                |
| show pxf cpu statistics drl ipv4     | 12.2(33)SCE                |
| show pxf cpu statistics drl ipv6     | 12.2(33)SCE                |
| show pxf cpu statistics drl us-cable | 12.2(33)SCE                |
| show packetcable cms                 | 12.2(33)SCF                |

### Modified Commands

| Command                          | Cisco IOS Software Release |
|----------------------------------|----------------------------|
| show pxf cpu queue               | 12.3(23)BC1                |
| show pxf cable                   | 12.2(33)SCB                |
| show pxf cable controller        | 12.2(33)SCB                |
| show pxf cpu queue               | 12.2(33)SCB                |
| show pxf cpu statistics          | 12.2(33)SCB                |
| show upgrade fpd file            | 12.2(33)SCB                |
| show upgrade fpd package default | 12.2(33)SCB                |
| show upgrade fpd progress        | 12.2(33)SCB                |

| Command                             | Cisco IOS Software Release |
|-------------------------------------|----------------------------|
| show upgrade fpd table              | 12.2(33)SCB                |
| show tech support                   | 12.2(33)SCB1               |
| show tech support                   | 12.3(23)BC7                |
| show processes cpu                  | 12.2(33)SCB3               |
| show pxf cpu statistics             | 12.2(33)SCE                |
| show running-config interface cable | 12.2(33)SCE                |
| show pxf cpu queue wb-spa           | 12.2(33)SCG                |
| show pxf cpu statistics             | 12.2(33)SCG                |
| show tech-support                   | 12.2(33)SCG                |

# show nls

To display the Network Layer Signalling (NLS) functionality state, use the **show nls** command in privileged EXEC mode.

## show nls

|                        |                                             |
|------------------------|---------------------------------------------|
| <b>Command Default</b> | Information for the NLS state is displayed. |
|------------------------|---------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| <b>Command History</b> | Release      | Modification                 |
|------------------------|--------------|------------------------------|
|                        | 12.3(21a)BC3 | This command was introduced. |

|                 |                                                                 |
|-----------------|-----------------------------------------------------------------|
| <b>Examples</b> | The following example shows the output of the show cpd command: |
|-----------------|-----------------------------------------------------------------|

|                                                                                        |
|----------------------------------------------------------------------------------------|
| <pre>Router# show nls NLS enabled NLS Authentication enabled NLS resp-timeout 45</pre> |
|----------------------------------------------------------------------------------------|

| <b>Related Commands</b> | Command | Description  |
|-------------------------|---------|--------------|
|                         | cpd     | Enables CPD. |

# show nls ag-id

To display authorization group ID information, use the **show nls ag-id** command in privileged EXEC mode.

**show nls ag-id**

**Command Default** Authorization group ID information is displayed. The authentication key is saved encrypted and is not displayed.

**Command Modes** Privileged EXEC

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.3(21a)BC3 | This command was introduced. |

**Examples** The following example shows the output of the **show nls-sg-id** command:

```
Router# show nls ag-id
Auth Group Id
12345
```

| Related Commands | Command | Description  |
|------------------|---------|--------------|
|                  | cpd     | Enables CPD. |

# show nls flow

To display NLS active flow information, use the **show nls flow** command in privileged EXEC mode.

## show nls flow

|                        |                                                 |
|------------------------|-------------------------------------------------|
| <b>Command Default</b> | Information for NLS active flows are displayed. |
|------------------------|-------------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| <b>Command History</b> | Release      | Modification                 |
|------------------------|--------------|------------------------------|
|                        | 12.3(21a)BC3 | This command was introduced. |

|                 |                                                                 |
|-----------------|-----------------------------------------------------------------|
| <b>Examples</b> | The following example shows the output of the show cpd command: |
|-----------------|-----------------------------------------------------------------|

```
Router# show nls flow
NLS flowid CPE IP CR Type CR ID NLS State
4294967295 16.16.1.1 1 1 PEND_B_RESP
```

| <b>Related Commands</b> | Command | Description  |
|-------------------------|---------|--------------|
|                         | cpd     | Enables CPD. |

# show packetcable cms

To display all gate controllers that are connected to the PacketCable client, use the **show packetcable cms** command in privileged EXEC mode.

**show packetcable cms** [**all** | **verbose**]

|                    |                |                                                                                                                                                      |
|--------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>all</b>     | (Optional) Specifies all gate controllers including the Common Open Policy Service (COPS) servers for which the PacketCable connection is gone down. |
|                    | <b>verbose</b> | (Optional) Provides detailed output with statistics for all gate controllers that are connected to the PacketCable client.                           |

**Command Default** All gate controllers currently connected to the PacketCable client are displayed.

**Command Modes** Privileged EXEC (#)

|                 |                               |                              |
|-----------------|-------------------------------|------------------------------|
| Command History | <b>Release</b>                | <b>Modification</b>          |
|                 | Cisco IOS Release 12.2(33)SCF | This command was introduced. |

**Usage Guidelines**

The **show packetcable cms** command displays various PacketCable counters including message exchanges and error frequency details to help detect any PacketCable errors. This command output can be periodically monitored to validate the overall health of a PacketCable solution.

In normal circumstances, the output of the **show packetcable cms all** command is not different from the output of the **show packetcable cms** command (default form of the command). However, the **show packetcable cms** command with the **all** keyword is used to capture all COPS servers including the servers for which the PacketCable connection is gone down.

**Examples**

The following is a sample output of the **show packetcable cms** command that shows all gate controllers that are currently connected to the PacketCable client in Cisco IOS Release 12.2(33)SCF:

```
Router# show packetcable cms

GC-Addr GC-Port Client-Addr COPS-handle Version PSID Key PDD-Cfg
1.100.30.2 47236 2.39.34.1 0x2FF9E268/1 4.0 0 0 0
2.39.26.19 55390 2.39.34.1 0x2FF9D890/1 1.0 0 0 2
```



The following is a sample output of the **show packetcable cms** command with the **all** keyword in Cisco IOS Release 12.2(33)SCF:

```
Router# show packetcable cms all
```

| GC-Addr    | GC-Port | Client-Addr | COPS-handle  | Version | PSID | Key | PDD-Cfg |
|------------|---------|-------------|--------------|---------|------|-----|---------|
| 1.100.30.2 | 47236   | 2.39.34.1   | 0x2FF9E268/1 | 4.0     | 0    | 0   | 0       |
| 2.39.26.19 | 55390   | 2.39.34.1   | 0x2FF9D890/1 | 1.0     | 0    | 0   | 2       |
| 1.10.30.22 | 42307   | 2.39.34.1   | 0x0 /0       | 4.0     | 0    | 0   | 0       |

The following is a sample output of the **show packetcable cms** command with the **verbose** keyword. This output provides additional information with statistics for all gate controllers that are connected to the PacketCable client.

```
Router# show packetcable cms verbose
```

```
Gate Controller
 Addr : 1.100.30.2
 Port : 47236
 Client Addr : 2.39.34.1
 COPS Handle : 0x2FF9E268
 Version : 4.0
 Statistics :
 gate del = 0 gate del ack = 0 gate del err = 0
 gate info = 0 gate info ack = 0 gate info err = 0
 gate open = 0 gate report state = 0
 gate set = 0 gate set ack = 0 gate set err = 0
 gate alloc = 0 gate alloc ack = 0 gate alloc err = 0
 gate close = 0

Gate Controller
 Addr : 2.39.26.19
 Port : 55390
 Client Addr : 2.39.34.1
 COPS Handle : 0x2FF9D890
 Version : 1.0
 Statistics :
 gate del = 0 gate del ack = 0 gate del err = 0
 gate info = 0 gate info ack = 0 gate info err = 0
 gate open = 0 gate report state = 0
 gate set = 2 gate set ack = 2 gate set err = 0
 PCMM Timers Expired
 Timer T1 = 0 Timer T2 = 0 Timer T3 = 0 Timer T4 = 0

GC-Addr GC-Port Client-Addr COPS-handle Version PSID Key PDD-Cfg
1.100.30.2 47236 2.39.34.1 0x2FF9E268/1 4.0 0 0 0
2.39.26.19 55390 2.39.34.1 0x2FF9D890/1 1.0 0 0 2
```

Table 243 describes the significant fields shown in the **show packetcable cms** command display.

**Table 243** *show packetcable cms Field Descriptions*

| Field       | Description                                                              |
|-------------|--------------------------------------------------------------------------|
| GC-Addr     | Gate controller IP address.                                              |
| GC-Port     | Port number of the gate controller.                                      |
| Client-Addr | PacketCable client IP address.                                           |
| COPS-handle | Unique value to identify a Common Open Policy Service (COPS) connection. |
| PSID        | Policy server ID.                                                        |

| Related Commands | Command                                   | Description                                                                                                      |
|------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dynamic-qos trace</b>            | Enables call trace functionality on the Cisco CMTS router for PacketCable or PacketCable Multimedia gates.       |
|                  | <b>debug cable dynamic-qos subscriber</b> | Enables debugging of the call trace functionality on the Cisco CMTS router for a particular subscriber.          |
|                  | <b>debug cable dynamic-qos trace</b>      | Enables call trace debugging on the Cisco CMTS router for all the subscribers for whom call trace is configured. |
|                  | <b>show cable dynamic-qos trace</b>       | Displays the number of subscribers for whom call trace is configured on the Cisco CMTS router.                   |

# show packetcable event

To display information the PacketCable event message (EM) server, use the **show packetcable event** command in user EXEC or privileged EXEC mode.

**show packetcable event { df-group | radius-server | rks-group }**

## Syntax Description

|                      |                                                                                                                                                                  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>df-group</b>      | Displays information about the Communications Assistance for Law Enforcement Act (CALEA) Delivery Function (DF) server groups that are configured on the router. |
| <b>radius-server</b> | Displays information about the EM Remote Authentication Dial In User Service (RADIUS) servers that are configured on the router.                                 |
| <b>rks-group</b>     | Displays information about the Record Keeping Server (RKS) groups that are configured on the router.                                                             |

## Command Modes

User EXEC, Privileged EXEC

## Command History

| Release     | Modification                                                                                         |
|-------------|------------------------------------------------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers. |

## Usage Guidelines

This command displays information about the authentication, authorization, and accounting (AAA) servers that are configured on the Cisco CMTS router for PacketCable operations. These include DF servers (used for CALEA redirection of event messages and traffic), RADIUS servers (used for authentication), and RKS servers (used for billing).

## Examples

The following example shows typical output for the **show packetcable event df-group** command, which shows the IP address and UDP port of the DF server to which event messages are being forwarded for CALEA electronic surveillance.

```
Router# show packetcable event df-group
```

```
CDC-address CDC-port
10.9.62.12 1816
```

```
Router#
```

The following example shows a typical display for the **show packetcable event radius-server** command, which shows the IP address for each RADIUS server that is configured on the router for PacketCable operations, along with the UDP port number that it is using.

```
Router# show packetcable event radius-server
```

```
,
Server-address Port
10.9.62.12 1816
10.9.62.20 1813
10.9.62.12 1813
```

## show packetcable event

Router#

The following example shows a typical display for the **show packetcable event rks-group** command.

Router# **show packetcable event rks-group**

```
Pri-addr Pri-port Sec-addr Sec-port Ref-cnt Batch-cnt
1.9.62.12 1813 1.9.62.20 1813 2 0
```

Router#

Table 0-244 describes the major fields shown in the **show packetcable event rks-group** display.

**Table 0-244 show packetcable event rks-group Field Display**

| Field     | Description                                                                                                                     |
|-----------|---------------------------------------------------------------------------------------------------------------------------------|
| Pri-addr  | IP address for the primary RKS server.                                                                                          |
| Pri-port  | UDP port for the primary RKS server.                                                                                            |
| Sec-addr  | IP address for the secondary RKS server.                                                                                        |
| Sec-port  | UDP port for the secondary RKS server.                                                                                          |
| Ref-cnt   | Number of times that the router send single event messages to the RKS server.                                                   |
| Batch-cnt | Number of times that the router sent batch messages (multiple Event Messages within a single RADIUS message) to the RKS server. |



### Tip

For complete information about PacketCable event messaging, see the *PacketCable Event Messages Specification*, which is available at the PacketCable Event Messages Specification PacketCable web site at the following URL:

<http://www.packetcable.com>

### Related Commands

| Command                                      | Description                                                                                            |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>clear packetcable gate counter commit</b> | Resets the counters that track the total number of committed gates.                                    |
| <b>packetcable</b>                           | Enables PacketCable operations on the Cisco CMTS.                                                      |
| <b>show packetcable gate counter commit</b>  | Displays the total number of committed gates since system reset or since the counter was last cleared. |
| <b>show packetcable global</b>               | Displays the current PacketCable configuration.                                                        |

# show packetcable gate

To display information about one or more gates in the gate database, use the **show packetcable gate** command in user EXEC or privileged EXEC mode.

**show packetcable gate** [**downstream** | **upstream**] {**summary** | *gate-id*}

|                           |                   |                                                                                                                |
|---------------------------|-------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>downstream</b> | (Optional) Display information only for gates in the downstream direction.                                     |
|                           | <b>upstream</b>   | (Optional) Display information only for gates in the upstream direction.                                       |
|                           | <b>summary</b>    | Display a summary containing the gate ID, subscriber ID, subscriber IP address, and current state information. |
|                           | <i>gate-id</i>    | Display information for a specific gate ID. The valid range is 0 to 4294967295.                                |

**Command Default** Displays information about gates on both upstreams and downstreams, if **upstream** or **downstream** is not specified.

**Command Modes** User EXEC, Privileged EXEC

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                      |
|------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.2(8)BC2     | This command was introduced for the Cisco uBR7200 series universal broadband router.                                                                     |
|                        | 12.2(11)BC3    | The output for the <b>summary</b> option was enhanced to display the cable interface and service flow IDs (SFIDs) associated with each PacketCable gate. |
|                        | 12.2(15)BC1    | Support was added for the Cisco uBR10012 router.                                                                                                         |

**Usage Guidelines** This command displays information about one or more gates in the gate database on the Cisco CMTS. You can display a summary for all currently active gates, for all downstream or all upstream gates, or you can display detailed information about a specific gate.

**Examples** The following example shows typical output for the **show packetcable gate summary** command, which displays all current gates on the CMTS:

```
Router# show packetcable gate summary
```

| GateID | Slot | SubscriberID | GC-Addr      | State  | SFID<br>(us) | SFID<br>(ds) |
|--------|------|--------------|--------------|--------|--------------|--------------|
| 2566   | 2/0  | 3.18.1.4     | 172.22.87.45 | COMMIT | 9            | 10           |
| 18950  | 2/0  | 3.18.1.5     | 172.22.87.45 | COMMIT | 7            | 8            |

```
Total number of gates = 2
```

```
Total Gates committed(since bootup or clear counter) = 2
```

The following example shows a typical display for a specific gate. Both downstream and upstream gates are shown unless you also specify either the **downstream** or **upstream** option.

Router# **show packetcable gate 196**

```

GateID : 196
Subscriber ID : 4.4.1.22
GC Address : 192.168.80.15
State : COMMITTED
Gate specs [UPSTREAM]
 Gate classifier : [protocol 17,
 src addr/port 4.4.1.22/0,
 dest addr/port 3.3.1.3/3456
 diffserv dscp : 0x6000000
 timer t1(ms) : 180000
 timer t2(ms) : 2000
 commit flags : 0x0
 session class : 0x1
 flowspec # 1 : [r/b/p/m/M 1176256512/1128792064/1176256512/200/200]
 [R/S: 1176256512/0]
Gate specs [DOWNSTREAM]
 Gate classifier : [protocol 17,
 src addr/port 3.3.1.3/0,
 dest addr/port 4.4.1.22/0
 diffserv dscp : 0x9000000
 timer t1(ms) : 180000
 timer t2(ms) : 2000
 commit flags : 0x0
 session class : 0x1
 flowspec # 1 : [r/b/p/m/M 1176256512/1128792064/1176256512/200/200]
 [R/S: 1176256512/0]
Remote Gate
 address/port : 172.22.79.22/1812
 gate coord flag : 2
 algo : 100
 security key[16] : 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35
Billing Info
 primary RKS : [addr/port 1.9.62.12/1813]
 secondary RKS : [addr/port 255.255.255.255/65535]
 flags : 0
 billing corr ID : [3D 38 96 CC 20 20 20 20 31 30 20 30 00 00 00 41]

```

Table 0-245 describes the major fields shown in the **show packetcable gate** display.

**Table 0-245** *show packetcable gate Field Display*

| Field         | Description                                                           |
|---------------|-----------------------------------------------------------------------|
| GateID        | Unique number identifying the local gate.                             |
| Slot          | Cable interface on the Cisco CMTS.                                    |
| Subscriber ID | IP address for the subscriber for this service request.               |
| GC-Addr       | IP address for the gate controller that is responsible for this gate. |

**Table 0-245** *show packetcable gate Field Display (continued)*

| Field                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| State                 | <p>Describes the current state of the gate in both the upstream and downstream directions. The possible state values are:</p> <ul style="list-style-type: none"> <li>• <b>ALLOC</b> = The CMTS has received a Gate-Alloc command from the gate controller and has created the gate in response. The CMTS must now wait for the request to be authorized.</li> <li>• <b>AUTH</b> = The CMTS has received a Gate-Set command from the gate controller that authorizes the resources needed for the gate request. The CMTS must now wait for the actual resources to be reserved.</li> <li>• <b>RSVD</b> = All required resources for the gate have been reserved.</li> <li>• <b>COMMIT</b> = All resources have been committed at both the local CMTS and remote CMTS. The local CMTS has also received a commit notification from the local MTA and has finished all gate coordination with the remote end. The gate can now pass traffic.</li> <li>• <b>INVLD</b> = The gate is invalid, typically because of an error condition or lack of resources. The CMTS will eventually delete the gate.</li> <li>• <b>UNKWN</b> = The gate is an unknown state.</li> </ul> |
| SFID (us)             | SFID for the upstream associated with this PacketCable gate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| SFID (ds)             | SFID for the downstream associated with this PacketCable gate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Total number of gates | Displays the total number of gates that are currently allocated, authorized, reserved, or committed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Total Gates committed | Displays the total number of gates that the CMTS has committed since the CMTS was last reset or since the counters were last cleared.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Tip**

For complete information about the State field, see section 5.4, Gate Control Protocol Operation, in the *PacketCable Dynamic Quality-of-Service Specification* (PKT-SP-DQOS-I03-020116).

**Related Commands**

| Command                                      | Description                                                                                            |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>clear packetcable gate counter commit</b> | Resets the counters that track the total number of committed gates.                                    |
| <b>packetcable</b>                           | Enables PacketCable operations on the Cisco CMTS.                                                      |
| <b>show packetcable gate counter commit</b>  | Displays the total number of committed gates since system reset or since the counter was last cleared. |
| <b>show packetcable global</b>               | Displays the current PacketCable configuration.                                                        |

# show packetcable gate counter commit

To display the total number of gates that the CMTS has put into the COMMITTED state since the CMTS was last reset or since the counter was last cleared, use the **show packetcable gate counter commit** command in user EXEC or privileged EXEC mode.

**show packetcable gate counter commit**

**Syntax Description** This command has no keywords or arguments.

**Command Default** No default behavior or values.

**Command Modes** User EXEC, Privileged EXEC

| Command History | Release     | Modification                                                                         |
|-----------------|-------------|--------------------------------------------------------------------------------------|
|                 | 12.2(8)BC2  | This command was introduced for the Cisco uBR7200 series universal broadband router. |
|                 | 12.2(15)BC1 | Support was added for the Cisco uBR10012 router.                                     |

**Usage Guidelines** This command displays the total number of gates that have been committed since the Cisco uBR7200 series router was restarted or since the counter was last cleared with the **clear packetcable gate counter commit** command.

  
**Note**

This command displays only the count of committed gates. It does not include gates that were allocated, authorized, and reserved but that were not put into the COMMITTED state.

**Examples** The following example shows that 132 gates have been committed since the Cisco CMTS was last reset or since the counters were last cleared:

```
Router# show packetcable gate counter commit

Total Gates committed (since bootup or clear counter) = 132
Router#
```

| Related Commands | Command                                      | Description                                                         |
|------------------|----------------------------------------------|---------------------------------------------------------------------|
|                  | <b>clear packetcable gate counter commit</b> | Resets the counters that track the total number of committed gates. |
|                  | <b>packetcable</b>                           | Enables PacketCable operations on the Cisco CMTS.                   |



| Command                        | Description                                                        |
|--------------------------------|--------------------------------------------------------------------|
| <b>show packetcable gate</b>   | Displays information about one or more gates in the gate database. |
| <b>show packetcable global</b> | Displays the current PacketCable configuration.                    |

# show packetcable gate ipv6

To display information about one or more PacketCable gates associated with IPv6 subscriber IDs in the gate database, use the **show packetcable gate ipv6** command in privileged EXEC mode.

**show packetcable gate ipv6 summary** [**downstream** {*gate-id* | **ipv6 summary**}] [**upstream** {*gate-id* | **ipv6 summary**}]

|                    |                                  |                                                                                                                                 |
|--------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>ipv6</b>                      | Specifies IPv6 subscriber IDs.                                                                                                  |
|                    | <b>summary</b>                   | Displays a summary of gates containing the gate ID, subscriber ID, subscriber IPv6 address, and the state information.          |
|                    | <b>downstream</b> <i>gate-id</i> | (Optional) Displays information for the specified gate ID in the downstream direction. The valid range is from 0 to 4294967295. |
|                    | <b>upstream</b> <i>gate-id</i>   | (Optional) Displays information for the specified gate ID in the upstream direction. The valid range is from 0 to 4294967295.   |

Command Default None

Command Modes Privileged EXEC(#)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCE    | This command was introduced. |

Usage Guidelines This command provides a summary of all active gates (downstream or upstream gates) for IPv6 subscribers.

Examples The following is a sample output of the **show packetcable gate ipv6** command that shows a summary of all the active downstream and upstream gates for IPv6 subscribers on a Cisco CMTS router:

```
Router# show packetcable gate ipv6 summary

GateID i/f SubscriberID State SFID(us) SFID(ds)
13582 Ca8/1/0 2001:40:1:42:C0B4:84E5:5081:9B5C COMMIT 74
29962 Ca8/1/0 2001:40:1:42:C0B4:84E5:5081:9B5C COMMIT 73
46354 Ca8/1/0 2001:40:1:42:C0B4:84E5:5081:9B5C COMMIT 72
62738 Ca8/1/0 2001:40:1:42:C0B4:84E5:5081:9B5C COMMIT 69

TTotal number of gates = 4
Total Gates committed(since bootup or clear counter) = 8
```

The following is a sample output of the **show packetcable gate ipv6** command that shows a summary of all downstream gates for IPv6 subscribers on a Cisco CMTS router:

```
Router# show packetcable gate downstream ipv6 summary
```

| GateID | i/f     | SubscriberID                     | State  | SFID(us) | SFID(ds) |
|--------|---------|----------------------------------|--------|----------|----------|
| 62738  | Ca8/1/0 | 2001:40:1:42:C0B4:84E5:5081:9B5C | COMMIT |          | 69       |

Total number of DS gates = 1

Total Gates committed(since bootup or clear counter) = 8

The following is a sample output of the **show packetcable gate ipv6** command that shows a summary of all upstream gates for IPv6 subscribers on the Cisco CMTS router:

```
Router# show packetcable gate upstream ipv6 summary
```

| GateID | i/f     | SubscriberID                     | State  | SFID(us) | SFID(ds) |
|--------|---------|----------------------------------|--------|----------|----------|
| 13582  | Ca8/1/0 | 2001:40:1:42:C0B4:84E5:5081:9B5C | COMMIT | 74       |          |
| 29962  | Ca8/1/0 | 2001:40:1:42:C0B4:84E5:5081:9B5C | COMMIT | 73       |          |
| 46354  | Ca8/1/0 | 2001:40:1:42:C0B4:84E5:5081:9B5C | COMMIT | 72       |          |

Total number of US gates = 3

Total Gates committed(since bootup or clear counter) = 8

[Table 0-245](#) describes the significant fields shown in the command display.

**Table 246** *show packetcable gate Field Display*

| Field         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GateID        | Unique number identifying the local gate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| i/f           | Cable interface on the Cisco CMTS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Subscriber ID | IPv6 address of the subscriber for this service request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| State         | Describes the state of the gate in both the upstream and downstream directions. The possible state values are: <ul style="list-style-type: none"> <li>• <b>ALLOC</b>—The CMTS has received a Gate-Alloc command from the gate controller and has created the gate in response. The CMTS must now wait for the request to be authorized.</li> <li>• <b>AUTH</b>—The CMTS has received a Gate-Set command from the gate controller that authorizes the resources needed for the gate request. The CMTS must now wait for the actual resources to be reserved.</li> <li>• <b>RSVD</b>—All required resources for the gate have been reserved.</li> <li>• <b>COMMIT</b>—All resources are committed at both the local CMTS and remote CMTS. The local CMTS has also received a commit notification from the local MTA and has completed all gate coordination with the remote end. The gate can now pass traffic.</li> <li>• <b>INVLD</b>—The gate is invalid, typically because of an error condition or lack of resources. The CMTS will eventually delete the gate.</li> <li>• <b>UNKWN</b>—The gate is in an unknown state.</li> </ul> |
| SFID (us)     | SFID for the upstream associated with this PacketCable gate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| SFID (ds)     | SFID for the downstream associated with this PacketCable gate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

show packetcable gate ipv6

**Table 246** *show packetcable gate Field Display (continued)*

| Field                                                 | Description                                                                                                                                |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Total number of gates                                 | Displays the total number of PCMM gates that are allocated, authorized, reserved, or committed.                                            |
| Total Gates committed (since bootup or clear counter) | Displays the total number of PCMM gates that the CMTS has committed since the CMTS was last reset or since the counters were last cleared. |

**Related Commands**

| Command                                     | Description                                                                                                        |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>packetcable</b>                          | Enables PacketCable operations on a Cisco CMTS router.                                                             |
| <b>show packetcable gate</b>                | Displays information about one or more PacketCable gates in the gate database.                                     |
| <b>show packetcable gate counter commit</b> | Displays the total number of committed PacketCable gates since system reset or since the counter was last cleared. |
| <b>show packetcable global</b>              | Displays the PacketCable configuration.                                                                            |

# show packetcable gate multimedia

To display information about the total number of PacketCable Multimedia (PCMM) multicast gates, use the **show packetcable gate multimedia** command in privileged EXEC mode.

## show packetcable gate multimedia multicast summary

| Syntax Description | <b>multicast</b> | Displays PCMM multicast information.                                                                                 |
|--------------------|------------------|----------------------------------------------------------------------------------------------------------------------|
|                    | <b>summary</b>   | Provides a summary of PCMM multicast gate ID, subscriber ID, gate controller address, and current state information. |

| Command Default | None |
|-----------------|------|
|-----------------|------|

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

**Examples** The following is a sample output of the **show packetcable gate multimedia** command on a Cisco CMTS router:

```
Router# show packetcable gate multimedia multicast summary
```

|        |         |              |            |        |      |          |          |
|--------|---------|--------------|------------|--------|------|----------|----------|
| GateID | i/f     | SubscriberID | GC-Addr    | State  | Type | SFID(us) | SFID(ds) |
| 134    | Ca5/0/0 | 60.1.1.202   | 2.39.26.19 | COMMIT | MM   |          | 4        |

```
Total number of Multimedia-MCAST gates = 1
```

```
Total Gates committed(since bootup or clear counter) = 1
```

[Table 0-245](#) describes the significant fields shown in the display.

**Table 247** *show packetcable gate multimedia Field Descriptions*

| Field         | Description                                                         |
|---------------|---------------------------------------------------------------------|
| GateID        | Unique number identifying the local PCMM multicast gate.            |
| i/f           | Cable interface on the Cisco CMTS router.                           |
| Subscriber ID | IP address of the subscriber for this service request.              |
| GC-Addr       | IP address of the gate controller that is responsible for the gate. |

**Table 247** *show packetcable gate multimedia Field Descriptions (continued)*

| Field                                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| State                                                 | <p>Describes the current state of the gate in the downstream direction. The possible state values are:</p> <ul style="list-style-type: none"> <li>• <b>ALLOC</b>—The CMTS has received a Gate-Alloc command from the gate controller and has created the gate in response. The CMTS must now wait for the request to be authorized.</li> <li>• <b>AUTH</b>—The CMTS has received a Gate-Set command from the gate controller that authorizes the resources needed for the gate request. The CMTS must now wait for the actual resources to be reserved.</li> <li>• <b>RSVD</b>—All required resources for the gate have been reserved.</li> <li>• <b>COMMIT</b>—All resources are committed at both the local CMTS and remote CMTS. The local CMTS has also received a commit notification from the local MTA and has completed all gate coordination with the remote end. The gate can now pass traffic.</li> <li>• <b>INVLD</b>—The gate is invalid, typically because of an error condition or lack of resources. The CMTS will eventually delete the gate.</li> <li>• <b>UNKWN</b>—The gate is in an unknown state.</li> </ul> |
| SFID (us)                                             | Service flow ID (SFID) for the upstream associated with this PCMM multicast gate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| SFID (ds)                                             | SFID for the downstream associated with this PCMM multicast gate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Total number of Multimedia-MCAST gates                | Total number of PCMM multicast gates that are currently allocated, authorized, reserved, or committed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Total Gates committed (since bootup or clear counter) | Total number of PCMM multicast gates that are committed since the Cisco CMTS router was last reset or since the counters were last cleared.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**Related Commands**

| Command                        | Description                                                                             |
|--------------------------------|-----------------------------------------------------------------------------------------|
| <b>cable multicast source</b>  | Configures a multicast session range for a PCMM multicast group on a Cisco CMTS router. |
| <b>show cable multicast db</b> | Displays the contents of the multicast explicit tracking database.                      |

# show packetcable global

To display the current PacketCable configuration, including the maximum number of gates, the Element ID, and the DQoS timer values, use the **show packetcable global** command in user EXEC or privileged EXEC mode.

## show packetcable global

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no keywords or arguments. |
|---------------------------|--------------------------------------------|

|                        |                                |
|------------------------|--------------------------------|
| <b>Command Default</b> | No default behavior or values. |
|------------------------|--------------------------------|

|                      |                            |
|----------------------|----------------------------|
| <b>Command Modes</b> | User EXEC, Privileged EXEC |
|----------------------|----------------------------|

| Command History | Release     | Modification                                                                                                                                                                                                                                   |
|-----------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(8)BC2  | This command was introduced for the Cisco uBR7200 series universal broadband router.                                                                                                                                                           |
|                 | 12.2(11)BC1 | Support was added to display the Element ID for the CMTS.                                                                                                                                                                                      |
|                 | 12.2(11)BC2 | Support was added to display whether non-PacketCable UGS service flows are authorized or not. The T2 and T5 timers were removed from the display to conform to the requirements of the PacketCable DQoS Engineering Change Notice (ECN) 02148. |
|                 | 12.2(15)BC1 | Support was added for the Cisco uBR10012 router.                                                                                                                                                                                               |

|                 |                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows a typical PacketCable configuration that is enabled and has the default values for all configurable parameters, except for the Element ID: |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# show packetcable global

Packet Cable Global configuration:
Enabled : Yes
Element ID: 12456
Max Gates : 1048576
Allow non-PacketCable UGS
Default Timer value -
 T0 : 30000 msec
 T1 : 300000 msec

Router#
```

[Table 0-248](#) describes the fields shown in the **show packetcable global** display.

**Table 0-248** *show packetcable global Field Display*

| Field                                                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enabled                                                    | Displays whether PacketCable operation is enabled or disabled. (See the <b>packetcable</b> command.)                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Element ID                                                 | Displays the Element ID for the CMTS. If you do not manually configure this parameter with the <b>packetcable element-id</b> command, it defaults to a random value between 0 and 99,999 when PacketCable operations is enabled.                                                                                                                                                                                                                                                                                            |
| Max Gates                                                  | Displays the maximum number of gates that the CMTS supports. (See the <b>packetcable gate maxcount</b> command.)                                                                                                                                                                                                                                                                                                                                                                                                            |
| Allow non-PacketCable UGS or Not Allow non-PacketCable UGS | Displays whether non-PacketCable, DOCSIS-style UGS service flows are allowed when PacketCable operations are enabled. (See the <b>packetcable authorize vanilla-docsis-mta</b> command.)                                                                                                                                                                                                                                                                                                                                    |
| Default Timer value                                        | Displays the current values of the following DQoS timers that the CMTS maintains. (See the <b>packetcable timer</b> command.)                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>T0</b>                                                  | <p>T0 specifies the amount of time that a gate ID can remain allocated without any specified gate parameters. The timer begins counting when a gate is allocated with a Gate-Alloc command. The timer stops when a Gate-Set command marks the gate as Authorized. If the timer expires without a Gate-Set command being received, the gate is deleted.</p> <p>The valid range is 1 to 1,000,000,000 milliseconds, with a default value of 30000 milliseconds (30 seconds).</p>                                              |
| <b>T1</b>                                                  | <p>T1 specifies the amount of time that an authorization for a gate can remain valid. It begins counting when the CMTS creates a gate with a Gate-Set command and puts the gate in the Authorized state. The timer stops when the gate is put into the committed state. If the timer expires without the gate being committed, the CMTS must close the gate and release all associated resources.</p> <p>The valid range is 1 to 1,000,000,000 milliseconds, with a default value of 200000 milliseconds (200 seconds).</p> |

**Related Commands**

| Command                                         | Description                                                                                                                                          |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>packetcable</b>                              | Enables PacketCable operations on the Cisco CMTS.                                                                                                    |
| <b>packetcable authorize vanilla-docsis-mta</b> | Allows Unsolicited Grant Service (UGS) service flows without a proper PacketCable gate ID when PacketCable operations are enabled on the Cisco CMTS. |
| <b>packetcable element-id</b>                   | Configures the PacketCable Event Message Element ID on the Cisco CMTS.                                                                               |
| <b>packetcable gate maxcount</b>                | Changes the maximum number of PacketCable gate IDs in the gate database on the Cisco CMTS.                                                           |
| <b>packetcable timer</b>                        | Changes the value of the different PacketCable DQoS timers.                                                                                          |
| <b>show packetcable gate</b>                    | Displays information about one or more gates in the gate database.                                                                                   |
| <b>show packetcable gate counter commit</b>     | Displays the total number of committed gates since system reset or since the counter was last cleared.                                               |



# show pxf cable

To display information about the multicast echo, packet intercept, or source-verify features for one or all cable interfaces, use the **show pxf cable** command in user EXEC or privileged EXEC mode.

```
show pxf cable { feature-table [cx/y/z] | maptable cx/y/z [sid] |
multicast-echo ds-group | multicast-echo mcast-addr | source-verify [ip address]}
```

| Syntax Description                         |  |                                                                                                                                                                                                                                                                           |
|--------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>feature-table</b> [cx/y/z]              |  | Displays the multicast echo and packet intercept status on the PXF processor. If given without any options, displays the status for all cable interfaces and subinterfaces. If given with an optional cable interface, displays the status for that particular interface. |
| <b>maptable</b> cx/y/z [sid]               |  | Displays memory and service ID (SID) information for a particular cable interface. If the optional <i>sid</i> parameter is specified, displays information for that particular SID.                                                                                       |
| <b>multicast-echo ds-group</b>             |  | Displays the cable interfaces that are associated with each downstream group, where each downstream group is a unique DOCSIS MAC domain. (Interfaces that are bundled together are considered one MAC domain.)                                                            |
| <b>multicast-echo</b><br><i>mcast-addr</i> |  | Displays the service flow ID (SFID) information for all multicast addresses that hash to the same index as the specified multicast IP address.                                                                                                                            |
| <b>source-verify</b><br>[ip-address]       |  | Displays the interface and SFID mapping tables that are maintained by the source-verify feature. If the optional <i>ip-address</i> parameter is specified, displays information only for that particular IP address.                                                      |

**Defaults** No default behavior or values.

**Command Modes** User EXEC (>)  
Privileged EXEC (#)

| Command History | Release                 | Modification                                                                                 |
|-----------------|-------------------------|----------------------------------------------------------------------------------------------|
|                 | 12.2(11)CY, 12.2(11)BC2 | This command was introduced as <b>show hardware pxf cable</b> for the Cisco uBR10012 router. |
|                 | 12.2(15)BC2             | This command was renamed from <b>show hardware pxf cable</b> to <b>show pxf cable</b> .      |
|                 | 12.3BC                  | This command was integrated into Cisco IOS release 12.3BC.                                   |
|                 | 12.2(33)SCA             | This command was integrated into Cisco IOS release 12.2(33)SCA.                              |
|                 | 12.2(33)SCB             | The command was modified and <b>verbose</b> option was removed.                              |

**Usage Guidelines** The **show pxf cable** command displays information about whether multicast echo and packet intercept are enabled on the cable interfaces. It can also be used to display the service flow ID (SFID) used for each multicast address that is being processed by the router.

**Note** The **source-verify** option is not supported on the PRE-2 module. Instead, use the **show pxf cpu cef verbose** command to display the primary SID information on the PRE-2 module.

## Examples

The following example shows a typical display for the **show pxf cable feature-table** command for all cable interfaces:

```
Router# show pxf cable feature-table
```

| Interface    | SWInterface | VCCI | McastEcho | Intercept | DSGroup | InterceptGroup |
|--------------|-------------|------|-----------|-----------|---------|----------------|
| Cable5/0/0   | Cable5/0/0  | 3    | On        | On        | 0       | 0              |
| Cable5/0/0.1 | Cable5/0/0  | 9    | On        | On        | 0       | 0              |
| Cable5/0/1   | Cable5/0/1  | 4    | On        | Off       | 255     | -              |
| Cable6/0/0   | Cable6/0/0  | 5    | On        | Off       | 255     | -              |
| Cable6/0/1   | Cable6/0/1  | 6    | On        | Off       | 255     | -              |
| Cable7/0/0   | Cable7/0/0  | 7    | On        | Off       | 1       | -              |
| Cable7/0/1   | Cable7/0/1  | 8    | On        | Off       | 2       | -              |

The following example shows a typical display for the **show pxf cable feature-table** option for a particular cable interface:

```
Router# show pxf cable feature-table c5/0/0
```

| Interface    | SWInterface | VCCI | McastEcho | Intercept | DSGroup | InterceptGroup |
|--------------|-------------|------|-----------|-----------|---------|----------------|
| Cable5/0/0   | Cable5/0/0  | 3    | On        | On        | 0       | 0              |
| Cable5/0/0.1 | Cable5/0/0  | 9    | On        | On        | 0       | 0              |

The following example shows a typical display for the **show pxf cable feature-table** option when a cable interface has a bundle interface configured without a corresponding master interface:

```
Router# show pxf cable feature-table
```

| Interface  | SWInterface                         | VCCI | McastEcho | Intercept | DSGrp | InterceptGrp |
|------------|-------------------------------------|------|-----------|-----------|-------|--------------|
| Cable5/0/0 | <No Cable Bundle Master Configured> |      |           |           |       |              |
| Cable5/0/1 | Cable5/0/1                          | 4    | On        | Off       | 11    | -            |
| Cable5/1/0 | <No Cable Bundle Master Configured> |      |           |           |       |              |
| Cable5/1/1 | Cable5/1/1                          | 6    | On        | Off       | 15    | -            |
| Cable6/0/0 | Cable6/0/0                          | 7    | On        | Off       | 0     | -            |
| Cable6/0/1 | Cable6/0/1                          | 8    | On        | Off       | 1     | -            |
| Cable6/1/0 | Cable6/1/0                          | 9    | On        | Off       | 6     | -            |
| Cable6/1/1 | Cable6/1/1                          | 10   | On        | Off       | 7     | -            |
| Cable7/0/0 | Cable7/0/0                          | 11   | On        | Off       | 8     | -            |
| Cable7/0/1 | Cable7/0/1                          | 12   | On        | Off       | 9     | -            |
| Cable7/1/0 | Cable7/1/0                          | 13   | On        | Off       | 4     | -            |
| Cable7/1/1 | Cable7/1/1                          | 14   | On        | Off       | 5     | -            |
| Cable8/0/0 | Cable8/0/0                          | 15   | On        | Off       | 255   | -            |
| Cable8/0/1 | Cable8/0/1                          | 16   | On        | Off       | 3     | -            |
| Cable8/1/0 | Cable8/1/0                          | 17   | On        | Off       | 12    | -            |
| Cable8/1/1 | Cable8/1/1                          | 18   | On        | Off       | 13    | -            |

Table 0-249 describes the fields shown by both forms of the **show pxf cable feature-table** command:

**Table 0-249** show pxf cable feature-table Field Descriptions

| Field       | Description                                                        |
|-------------|--------------------------------------------------------------------|
| Interface   | Identifies the cable interface or subinterface.                    |
| SWInterface | Identifies the master cable interface for bundled interfaces.      |
| McastEcho   | Displays whether multicast echo is enabled (On) or disabled (Off). |

**Table 0-249** *show pxf cable feature-table Field Descriptions (continued)*

| Field          | Description                                                                                                                                                                                                                                                                                                                                            |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VCCI           | Displays the Virtually Cool Common Index (VCCI) for this cable interface or subinterface. The VCCI is an index that uniquely identifies every interface or subinterface on the PXF processor, and that quickly maps that interface to the appropriate set of services and features.                                                                    |
| Intercept      | Displays whether packet intercept, as per the Communications Assistance of Law Enforcement Act (CALEA), is enabled (On) or disabled (Off).                                                                                                                                                                                                             |
| DSGroup        | Displays the downstream group (unique MAC domain) that is associated with this interface or subinterface. Interfaces that are bundled together are considered one MAC domain.<br><br><b>Note</b> A downstream group number of 255 indicates that the CMTS has not assigned the interface to a MAC domain, typically because the interface is shutdown. |
| InterceptGroup | Displays the intercept packet group assigned to this cable interface.                                                                                                                                                                                                                                                                                  |

The following example shows a typical display for the **show pxf cable mactable** command for a particular cable interface:

```
Router# show pxf cable mactable c5/1/0
```

|     |      |           |        |     |     |               |
|-----|------|-----------|--------|-----|-----|---------------|
| SID | VCCI | FIB Index | SrcVfy | Pri | SID | CM IP Address |
| 1   | 3    | 0         | On     | 1   |     | 10.10.11.31   |
| 2   | 3    | 0         | On     | 2   |     | 10.10.11.129  |

[Table 0-250](#) describes the fields shown by the **show pxf cable mactable** command:

**Table 0-250** *show pxf cable mactable Field Descriptions*

| Field         | Description                                                                                                                                                                                                                                                                         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SID           | Identifies the service ID (SID).                                                                                                                                                                                                                                                    |
| VCCI          | Displays the Virtually Cool Common Index (VCCI) for this cable interface or subinterface. The VCCI is an index that uniquely identifies every interface or subinterface on the PXF processor, and that quickly maps that interface to the appropriate set of services and features. |
| FIB Index     | Identifies the forwarding information base (FIB) being used.                                                                                                                                                                                                                        |
| SrcVfy        | Identifies whether the source-verify feature (enabled with the <b>cable source-verify</b> command) is On or Off for this SID and interface.                                                                                                                                         |
| Pri SID       | Identifies the primary SID associated with this SID, in case this SID is a secondary or dynamic SID.                                                                                                                                                                                |
| CM IP Address | Displays the IP address for the CM that is associated with this SID.                                                                                                                                                                                                                |

The following example shows a typical display for the **show pxf cable multicast-echo ds-group** command, listing each downstream multicast group and its associated cable interface:

```
Router# show pxf cable multicast-echo ds-group
```

|          |            |
|----------|------------|
| DS Group | Interface  |
| 0        | Cable5/0/0 |
| 1        | Cable7/0/0 |

2 Cable7/0/1

The following example shows a typical display for the **show pxf cable multicast-echo** command for a particular multicast address:

```
Router# show pxf cable multicast-echo 230.1.1.1

Src I/f SFID DS Jib Header Packets Bytes
230.1.1.1 Cable7/0/1 16385 0x0000 0000 1000 0001 1000 321 2160
```

Table 0-251 describes the fields shown by the **show pxf cable multicast-echo** command:

**Table 0-251** *show pxf cable multicast-echo Field Descriptions*

| Field         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Src           | Multicast address being displayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| I/F           | Cable interface being used for this multicast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SFID          | Displays the service flow ID (SFID) for this particular multicast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| DS Jib Header | Shows the bitmask used for this multicast address on the PRE's MAC-layer processor. The bitmask consists of ten hexadecimal bytes in the following format (reading left to right, from most significant to least significant bit): <ul style="list-style-type: none"> <li>Bytes 9:8 = Specifies the key index for the downstream.</li> <li>Bytes 7:6 = Identifies the rule number used for packet header suppression (if enabled)</li> <li>Byte 5 = Bitmask that defines the type of packet transmitted: <ul style="list-style-type: none"> <li>Bit 4 = 1 if padding CRC for data packets, 0 if not padding the CRC</li> <li>Bit 3 = 1 if inserting an extended header (EH) for PHS processing</li> <li>Bit 2 = 1 if inserting an extended header (EH) for BPI+ processing</li> <li>Bits 1:0 = Specifies the packet type: <ul style="list-style-type: none"> <li>00 = Data packet</li> <li>01 = MAC management message for transmitted packets</li> <li>10 = Internal MAP message on upstream</li> <li>11 = Special packet</li> </ul> </li> </ul> </li> <li>Byte 4 = Bitmask that identifies the type of map control and key sequence for the packet: <ul style="list-style-type: none"> <li>Bits 6:4 = Destination upstream for the MAP message</li> <li>Bits 3:0 = BPI Key Sequence number</li> </ul> </li> <li>Bytes 3:2 = Index to obtain the downstream modem statistics.</li> <li>Byte 1 = Specifies the assumed minimum size of a packet data unit. Multiply this byte by 4 to get the actual minimum size in bytes.</li> <li>Byte 0 = Specifies the DOCSIS header size, with a maximum value of 0xE0 (248 decimal).</li> </ul> |
| Packets       | Number of packets sent to this address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Bytes         | Number of bytes sent to this address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

The following example shows a typical display for the **show pxf cable source-verify** command:

```
Router# show pxf cable source-verify
```

| IP Address | Interface  | Fib Index | Mac-Domain | SID |
|------------|------------|-----------|------------|-----|
| 50.1.1.3   | Cable5/0/0 | 0         | 0          | 1   |
| 50.1.1.29  | Cable5/0/0 | 0         | 0          | 2   |
| 50.1.1.32  | Cable5/0/0 | 0         | 0          | 2   |
| 50.1.2.6   | Cable8/0/0 | 0         | 6          | 1   |
| 50.1.2.19  | Cable8/0/0 | 0         | 6          | 1   |

Table 0-252 describes the fields shown by the **show pxf cable source-verify** command:

**Table 0-252** *show pxf cable source-verify Field Descriptions*

| Field      | Description                                                                       |
|------------|-----------------------------------------------------------------------------------|
| IP Address | Identifies the IP addresses that have been verified by the source-verify feature. |
| Interface  | Identifies the cable interface or subinterface used for this IP address.          |
| FIB Index  | Identifies the forwarding information base (FIB) being used.                      |
| Mac-Domain | Identifies the MAC DOCSIS downstream domain for this IP address.                  |
| SID        | Identifies the service ID (SID).                                                  |

#### Related Commands

| Command                         | Description                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>cable source-verify</b>      | Enables verification of IP addresses for CMs and CPE devices on the upstream.                                                |
| <b>clear pxf</b>                | Clears the direct memory access (DMA) and error checking and correcting (ECC) error counters on the PXF processor.           |
| <b>debug pxf</b>                | Enables debugging of the PXF subsystems on the active PRE1 module on the Cisco uBR10012 router.                              |
| <b>show pxf cable interface</b> | Displays display DOCSIS-related information about a particular service ID (SID) on a particular cable interface.             |
| <b>show pxf cpu</b>             | Displays the display different statistics about the operation of the CPU processor during PXF processing.                    |
| <b>show pxf microcode</b>       | Displays identifying information for the microcode being used on the processor.                                              |
| <b>show pxf xcm</b>             | Displays the current state of error checking and correcting (ECC) for the External Column Memory (XCM) on the PXF processor. |

# show pxf cable controller

To display information about radio frequency (RF) channel Versatile Traffic Management System (VTMS) links and link queues, use the **show pxf cable controller** command in privileged EXEC mode.

**show pxf cable controller modular-cable slot/subslot/unit rf-channel channel [link queues]**

|                    |                          |                                                                                                                                                                                                                         |
|--------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>modular-cable</b>     | Specifies the modular cable interface.                                                                                                                                                                                  |
|                    | <i>slot/subslot/unit</i> | Identifies a cable interface on the Cisco uBR10012 router. The following are valid values: <ul style="list-style-type: none"><li>• <i>slot</i>—1 or 3</li><li>• <i>subslot</i>—0 or 1</li><li>• <i>unit</i>—0</li></ul> |
|                    | <b>rf-channel</b>        | Specifies the RF channel physical port on the Wideband SPA field-programmable gate array (FPGA).                                                                                                                        |
|                    | <i>channel</i>           | Specifies the number of the RF channel. The range is 0 to 23.                                                                                                                                                           |
|                    | <b>link queues</b>       | (Optional) Displays the link queue information for the specified RF channel.                                                                                                                                            |
|                    |                          |                                                                                                                                                                                                                         |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                                                                 |
|-----------------|----------------|-----------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                             |
|                 | 12.3(23)BC1    | This command was introduced.                                    |
|                 | 12.2(33)SCB    | This command was integrated into Cisco IOS Release 12.2(33)SCB. |

|                  |                                                                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>show pxf cable controller</b> command displays information about VTMS link queues only on the Cisco uBR10012 universal broadband router. |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                      |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example using the <b>show pxf cable controller</b> command, omitting the <b>link queues</b> option, displays only VTMS-related output: |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------|

Router# **show pxf cable controller modular-cable 1/0/0 rf-channel 3**

```
Link ID is 32259
 link next_send: 0x00000000 channel number: 0
 temporary bgbw: 0x00000000 reserved bgbw: 0x00000000
col.6 link bandwidth mult: 55778 shift: 18
col.7 link bandwidth mult: 55778 shift: 18
 link aggregate cir: 0x00000000 aggregate eir: 0x00000000
 bw reclaimed/trunc eir: 0/0 link cir_max: 0xFFFF
 link cir_sum: 70 link eir_sum: 2
 link bw_sum: 0 act. link q num: 0
```

The following example using the **show pxf cable controller** command including the **link queues** option, displays VTMS-related output as well as link queue-related output:

```
Router# show pxf cable controller modular-cable 1/0/0 rf-channel 3 link-queues
```

```
Link ID is 32259
 link next_send: 0x00000000 channel number: 0
 temporary bgbw: 0x00000000 reserved bgbw: 0x00000000
col.6 link bandwidth mult: 55778 shift: 18
col.7 link bandwidth mult: 55778 shift: 18
 link aggregate cir: 0x00000000 aggregate eir: 0x00000000
 bw reclaimed/trunc eir: 0/0 link cir_max: 0xFFFF
 link cir_sum: 70 link eir_sum: 2
 link bw_sum: 0 act. link q num: 0
```

Link Queues :

| QID | CIR(act/conf) | EIR | MIR         | WB Chan. | Status   |
|-----|---------------|-----|-------------|----------|----------|
| 420 | 13107/13107   | 1/1 | 65535/65535 | 0        | Inactive |
| 423 | 32768/32768   | 1/1 | 65535/65535 | 2        | Inactive |

See [Table 253](#) for descriptions of link queue fields.

**Table 253** *show pxf cable controller Link Queue Field Descriptions*

| Field          | Description                                                                                                                                                                                                                                                                                                                                             |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QID            | Displays the identification number of the link queue.                                                                                                                                                                                                                                                                                                   |
| CIR (act/conf) | Displays the information for the committed information rate (CIR) of link queues on this RF channel. <ul style="list-style-type: none"> <li>The first number, <i>act</i>, indicates the parameter that a link queue is actually using.</li> <li>The second number, <i>conf</i>, indicates the parameter that is configured for a link queue.</li> </ul> |
| EIR            | Displays the information for the excess information rate (EIR) of link queues on this RF channel. <ul style="list-style-type: none"> <li>The first number in the output indicates the parameter that a link queue is actually using.</li> <li>The second number in the output indicates the parameter that is configured for a link queue.</li> </ul>   |
| MIR            | Displays the information for the maximum information rate (MIR) of link queues on this RF channel. <ul style="list-style-type: none"> <li>The first number in the output indicates the parameter that a link queue is actually using.</li> <li>The second number in the output indicates the parameter that is configured for a link queue.</li> </ul>  |
| WB Chan        | The number of the wideband cable channel.                                                                                                                                                                                                                                                                                                               |
| Status         | Displays the state of the link queue.                                                                                                                                                                                                                                                                                                                   |

show pxf cable controller

| Related Commands | Command                     | Description                                                                                                      |
|------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------|
|                  | debug cr10k-rp<br>dbs-queue | Displays debug information for dynamic bandwidth sharing (DBS) on the Cisco uBR10012 universal broadband router. |
|                  | show pxf cpu queue          | Displays parallel express forwarding (PXF) queueing and link queue statistics.                                   |



# show pxf cable feature

To display multicast echo, packet intercept, or source-verify features for one or all cable interfaces, to include information for virtual interface bundles, use the **show pxf cable feature** command in privileged EXEC mode.

**show pxf cable feature**

**Syntax Description** This command has no additional arguments or keywords.

**Command Default** Display output without page breaks and remove passwords and other security information.

**Command Modes** User EXEC, Privileged EXEC

| Command History | Release    | Modification                                                                                        |
|-----------------|------------|-----------------------------------------------------------------------------------------------------|
|                 | 12.3(21)BC | This command was introduced to support Multicast with Virtual Interface Bundling on the Cisco CMTS. |

**Usage Guidelines** Refer to the following document on Cisco.com for additional information about cable interface bundling and virtual interface bundling on the Cisco CMTS:

- *Cable Interface Bundling and Virtual Interface Bundling on the Cisco CMTS*

**Examples** The following example illustrates Multicast Echo and virtual interface bundling information on the Cisco uBR10012 router.

```
Router# show pxf cable feature
Interface SWInterface VCCI McastEcho Intercept SrcVfy DHCP DSGrp InterceptGrp
Cable5/0/0 Bundle1 36 On Off On On On 0
Cable5/0/1 Cable5/0/1 15 On Off Off Off Off 11
Cable5/1/0 Bundle1 36 On Off On On On 0
Cable5/1/1 Cable5/1/1 17 On Off Off Off Off 9
Cable6/0/0 Bundle1 36 On Off On On On 0
Cable6/0/1 Cable6/0/1 19 On Off Off Off Off 12
Cable6/1/0 Cable6/1/0 20 On Off Off Off Off 7
Cable6/1/1 Cable6/1/1 21 On Off Off Off Off 8
Cable7/0/0 Cable7/0/0 22 On Off Off Off Off 255
Cable7/0/0 Cable7/0/0.1 42 On Off Off Off Off 255
Cable7/0/1 Bundle200 38 On Off Off Off Off 3
```

**Related Commands**

| Command                                    | Description                                                                                                                                                                        |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable bundle</b>                        | Configures a cable interface to belong to an interface bundle or virtual interface bundle.                                                                                         |
| <b>show arp</b>                            | Displays the entries in the router's ARP table.                                                                                                                                    |
| <b>show cable bundle forwarding-table</b>  | Displays the MAC forwarding table for the specified bundle, showing the MAC addresses of each cable modem in a bundle and the physical cable interface that it is currently using. |
| <b>show cable modem</b>                    | Displays the cable modems that are online both before and after cable interface bundling has been configured.                                                                      |
| <b>show running-config interface cable</b> | Displays the configuration for the specified cable interface.                                                                                                                      |

# show pxf cable interface

To display information about a particular service ID (SID) on a particular cable interface, use the **show pxf cable** command in user EXEC or privileged EXEC mode.

```
show pxf cable interface cable x/y/z sid {classifiers | mac-rewrite | queue | service-flow ds | service-flow us}
```

| Syntax Description        |  |                                                                                                                     |
|---------------------------|--|---------------------------------------------------------------------------------------------------------------------|
| <b>cable</b> <i>x/y/z</i> |  | Identifies the cable interface for which information should be displayed.                                           |
| <i>sid</i>                |  | Identifies the service ID (SID) for which information should be displayed. The valid range is 1 to 8191.            |
| <b>classifiers</b>        |  | Displays the packet classifiers used for this SID.                                                                  |
| <b>mac-rewrite</b>        |  | Displays the CPE MAC information for this SID.                                                                      |
| <b>queue</b>              |  | Displays the status of the queues being used by this SID.                                                           |
| <b>service-flow ds</b>    |  | Displays the service flow IDs (SFID) associated with the given SID on the downstream for the given cable interface. |
| <b>service-flow us</b>    |  | Displays the SFIDs associated with the given SID on the upstream for the given cable interface.                     |

**Command Default** No default behavior or values.

**Command Modes** User EXEC, Privileged EXEC

| Command History | Release     | Modification                                                                                                |
|-----------------|-------------|-------------------------------------------------------------------------------------------------------------|
|                 | 12.2(11)BC2 | This command was introduced as <b>show hardware pxf cable</b> for the Cisco uBR10012 router.                |
|                 | 12.2(15)BC2 | This command was renamed from <b>show hardware pxf cable interface</b> to <b>show pxf cable interface</b> . |

**Usage Guidelines** The **show pxf cable interface** command displays the DOCSIS-related information for a particular service ID (SID) on a particular cable interface.

**Examples** The following example shows a typical display for SID 1 on cable interface c8/0/0 for the **show pxf cable interface classifiers** command:

```
Router# show pxf cable interface c8/0/0 1 classifiers
CM Classifiers:
Mac Rw Index: 18 CCB Index: 47
id=1, sfid=91 CFR Index 16461 RP sfindex 16461,
prio=7, sip=0.0.0.0, sip mask=0.0.0.0
dip=0.0.0.0, dip mask=0.0.0.0, prot=17, tos=0,FF
sport = 0,65535, dport = 0,65535 matches = 0
```

## show pxf cable interface

```
id=2, sfid=92 CFR Index 16462 RP sfindex 16462,
prio=6, sip=0.0.0.0, sip mask=0.0.0.0
dip=1.11.22.2, dip mask=255.255.255.255, prot=256, tos=0,FF
sport = 0,65535, dport = 0,65535 matches = 0

id=0, sfid=0 CFR Index 0 RP sfindex 0,
prio=0, sip=0.0.0.0, sip mask=0.0.0.0
dip=0.0.0.0, dip mask=0.0.0.0, prot=0, tos=2,1
sport = 1000,500, dport = 1000,500 matches = 0

id=0, sfid=0 CFR Index 0 RP sfindex 0,
prio=0, sip=0.0.0.0, sip mask=0.0.0.0
dip=0.0.0.0, dip mask=0.0.0.0, prot=0, tos=2,1
sport = 1000,500, dport = 1000,500 matches = 0

```

Router#



### Note

For a description of the fields that are displayed by this command, see section C.2.1., Packet Classification Encodings, in Appendix C of the DOCSIS 1.1 specification (*Data-Over-Cable Service Interface Specifications Radio Frequency Interface Specification*, SP-RF1v1.1-I08-020301).

The following example shows a typical display for SID 1 on cable interface c8/0/0 for the **show pxf cable interface mac-rewrite** command:

```
Router# show pxf cable interface c8/0/0 1 mac-rewrite
```

```
CPE Information for Interface Cable8/0/0 SID 1:
Link Table Slot: 18 Mac-rw-index: 18
```

Router#

The following example shows a typical display for SID 1 on cable interface c8/0/0 for the **show pxf cable interface queue** command:

```
Router# show pxf cable interface c8/0/0 1 queue
```

```
RP SFID 16460 LC SFID 4
Queue Index: 281 QID 281 VCCI 6161 ClassID 9 Refcount 1
Priority: Lo Rates:(Act/Conf) CIR 0/0 MIR 0/16383 EIR 0/431
Statistics: Length 0 Pkts 0 Octets 0 TailDrops 0 BufferDrops 0

RP SFID 16461 LC SFID 91
Queue Index: 282 QID 282 VCCI 6161 ClassID 10 Refcount 1
Priority: Lo Rates:(Act/Conf) CIR 0/0 MIR 0/16383 EIR 0/431
Statistics: Length 0 Pkts 0 Octets 0 TailDrops 0 BufferDrops 0

RP SFID 16462 LC SFID 92
Queue Index: 283 QID 283 VCCI 6161 ClassID 11 Refcount 1
Priority: Lo Rates:(Act/Conf) CIR 0/0 MIR 0/16383 EIR 0/431
Statistics: Length 0 Pkts 0 Octets 0 TailDrops 0 BufferDrops 0

RP SFID 16463 LC SFID 93
Queue Index: 284 QID 284 VCCI 6161 ClassID 12 Refcount 1
Priority: Lo Rates:(Act/Conf) CIR 0/0 MIR 0/16383 EIR 0/431
Statistics: Length 0 Pkts 0 Octets 0 TailDrops 0 BufferDrops 0

RP SFID 16464 LC SFID 94
Queue Index: 285 QID 285 VCCI 6161 ClassID 13 Refcount 1
Priority: Lo Rates:(Act/Conf) CIR 0/0 MIR 0/16383 EIR 0/431
Statistics: Length 0 Pkts 0 Octets 0 TailDrops 0 BufferDrops 0
```

Router#

The following example shows a typical display for SID 1 on cable interface c8/0/0 for the **show pxf cable interface service-flow ds** command:

Router# **show pxf cable interface c8/0/0 1 service-flow ds**

| RP SFID | LC SFID | Bytes | Packets | QID |
|---------|---------|-------|---------|-----|
| 16460   | 4       | 0     | 0       | 281 |
| 16461   | 91      | 0     | 0       | 282 |
| 16462   | 92      | 0     | 0       | 283 |
| 16463   | 93      | 0     | 0       | 284 |
| 16464   | 94      | 0     | 0       | 285 |

Router#

The following example shows a typical display for SID 1 on cable interface c8/0/0 for the **show pxf cable interface service-flow us** command:

Router# **show pxf cable interface c8/0/0 1 service-flow us**

| SFID | SID |
|------|-----|
| 3    | 1   |
| 90   | 21  |

Router#

## Related Commands

| Command                   | Description                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>clear pxf</b>          | Clears the direct memory access (DMA) and error checking and correcting (ECC) error counters on the PXF processor.           |
| <b>debug pxf</b>          | Enables debugging of the PXF subsystems on the active PRE1 module on the Cisco uBR10012 router.                              |
| <b>show pxf cable</b>     | Displays information about the multicast echo and packet intercept features for one or all cable interfaces.                 |
| <b>show pxf cpu</b>       | Displays the display different statistics about the operation of the CPU processor during PXF processing.                    |
| <b>show pxf microcode</b> | Displays identifying information for the microcode being used on the processor.                                              |
| <b>show pxf xcm</b>       | Displays the current state of error checking and correcting (ECC) for the External Column Memory (XCM) on the PXF processor. |

# show pxf cable multicast

To display information about multicast routes (mroute) in the PXF processor for a specified group, use the **show pxf cable multicast** command in privileged EXEC mode.

```
show pxf cable multicast [multicast-group]
```

|                    |                 |                                                      |
|--------------------|-----------------|------------------------------------------------------|
| Syntax Description | multicast-group | (Optional) Displays the name of the multicast group. |
|--------------------|-----------------|------------------------------------------------------|

|                 |                                |
|-----------------|--------------------------------|
| Command Default | No default behavior or values. |
|-----------------|--------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

| Command History | Release     | Modification                |
|-----------------|-------------|-----------------------------|
|                 | 12.2(33)SCB | The command was introduced. |

|                  |                                                                                                                            |
|------------------|----------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>show pxf cable multicast</b> command displays information about whether routes are enabled on the cable interfaces. |
|------------------|----------------------------------------------------------------------------------------------------------------------------|

Examples

The following example shows a typical display for the **show pxf cable multicast** command for all cable interfaces:

```
Router# show pxf cable multicast multicast-group

MDB Flags: L - Local, F - Register flag, T - SPT-bit set, J - Join SPT
Z - Multicast Tunnel, N- No FastSwitching
OIF Flags: P - Prune Flag, A - Assert Flag
PXF multicast switching for vrf default is enabled.
Mdb at index= 3 hash= 0xE9F7:
next_mdb_idx: 0, fib_root: 0x0001, source_addr: 0.0.0.0, group_addr: 230.1.1.1
uses: 0, bytes: 0, vcci_in: 0, oif: 0x000002
rpf_failed: 0, drop_others: 0
rp_bit_mask:0x00, flags: [0xA0]
Ref Count=0, MDB Flags=0x0082, MDB FastFlags=0x10
```

| Related Commands | Command                  | Description                                                                                                      |
|------------------|--------------------------|------------------------------------------------------------------------------------------------------------------|
|                  | show pxf cable interface | Displays display DOCSIS-related information about a particular service ID (SID) on a particular cable interface. |
|                  | show pxf cpu             | Displays the display different statistics about the operation of the CPU processor during PXF processing.        |

# show pxf cpu

To display the display different statistics about the operation of the CPU on the Performance Routing Engine (PRE1) module during Parallel eXpress Forwarding (PXF) processing, use the **show pxf cpu** command in user EXEC or privileged EXEC mode.

```
show pxf cpu {access-lists {qos | security} | buffers |
cef [mem | verbose | vrf ip-address mask] | context | mroute [ipaddress1] [ipaddress2] |
queue [interface] | schedule [interface | summary] | statistics [diversion [detail] | drop
[interface] | ip | mlp] | subblocks [interface]}
```

## Syntax Description

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>access-lists {qos   security}</b>             | Displays information for either quality of service (QoS) access lists (ACLs) or security access lists.<br><br><b>Note</b> The PRE module automatically compiles all access lists into the turbo ACL format, so that they can be efficiently processed by the PXF processors. The only exception are very simple access lists that would require more processing time to be compiled than to be executed. |
| <b>buffers</b>                                   | Displays information about buffer usage on the processor.                                                                                                                                                                                                                                                                                                                                                |
| <b>cef [mem   verbose   vrf ip-address mask]</b> | Displays information about the memory usage and routing tables in the PXF processors for Cisco Express Forwarding (CEF) operation. Optionally displays detailed information about memory usage and about a particular entry in the virtual private network (VPN) routing/forwarding (VRF) tables.                                                                                                        |
| <b>context</b>                                   | Displays performance statistics on the processing of contexts on the processors. (A context is a unit of packet processing time on the PXF processor.)<br><br><b>Note</b> The <b>show pxf cpu context</b> command displays more useful information on the PXF processor's performance than the <b>show processor cpu command</b> that is used on other platforms.                                        |
| <b>mroute [ipaddress1] [ipaddress2]</b>          | Displays multicast static route (mroute) information for all groups, for one particular group, or for a range of groups.<br><br>Displays information about IP multicast routes in the PXF processor for a specified IP prefix. For a more user-friendly display of the same information, use the <b>show ip mroute</b> command.                                                                          |
| <b>queue [interface]</b>                         | Displays queue drop counters for all interfaces, or optionally for one selected interface. This can be useful in determining if traffic is being properly distributed among the correct interfaces.                                                                                                                                                                                                      |
| <b>schedule [interface   summary]</b>            | Displays the timing wheel dequeue schedule counters for all interfaces, or optionally for one interface, or optionally a summary of all interfaces.                                                                                                                                                                                                                                                      |

|                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>statistics</b><br><b>[diversion [detail]   drop [interface]   ip   mlp]</b> | <p>Displays statistics for the packets that the PXF has processed. The default is to display all packet statistics, or you can optionally specify one of the following keywords to display a particular type of statistics:</p> <ul style="list-style-type: none"> <li>• <b>diversion</b>—(Optional) Displays packets that the PXF diverted to the main route processor for special handling. Use the detail keyword to break down the statistics by the particular reason for the diversion.</li> <li>• <b>drop [interface]</b>—(Optional) Displays dropped packets and bytes. You can also optionally display the dropped packets for a particular interface.</li> <li>• <b>ip</b>—(Optional) Displays statistics for the processing of IP and ICMP packets.</li> <li>• <b>mlp</b>—(Optional) Displays statistics for multilink point-to-point protocol (MLPPP) packets.</li> </ul> |
| <b>subblocks [interface]</b>                                                   | Displays subblocks information for all interfaces, or optionally for one interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Command Default** No default behavior or values

**Command Modes** User EXEC, Privileged EXEC

| Command History | Release     | Modification                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(1)XF1  | This command was introduced as <b>show hardware pxf cpu</b> for the Cisco uBR10012 router.                                                                                                                                                                                                                                                                                     |
|                 | 12.2(11)BC2 | The MAC domain was added to the display of the <b>show pxf cpu subblocks</b> command for a particular cable interface.                                                                                                                                                                                                                                                         |
|                 | 12.2(15)BC2 | This command was renamed from <b>show hardware pxf cpu</b> to <b>show pxf cpu</b> . In addition, the <b>cef</b> option was enhanced to display CEF tag adjacency information. The <b>verbose</b> option was also added to the <b>cef</b> option to display more detailed information about the Forwarding Information Base (FIB) tables being maintained by the CEF subsystem. |
|                 | 12.3(X)BC   | The <b>detail</b> option and additional counters were added to the <b>show pxf cpu statistics diversion</b> command.                                                                                                                                                                                                                                                           |

**Examples** See the following sections for typical displays for the different forms of the **show pxf cpu** command.

**Access-Lists**

The following example shows a typical display for the **access-list qos** option, which displays information about the processing of quality-of-service (QoS) access-lists:

```
Router# show pxf cpu access qos

PXF QoS ACL statistics:
ACL State Tables Entries Config Fragment Redundant Memory
101 Operational 1 9 1 0 0 1Kb
First level lookup tables:
```



```

Block Use Rows Columns Memory used
0 TOS/Protocol 1/128 0/32 16384
1 IP Source (MS) 1/128 0/32 16384
2 IP Source (LS) 1/128 0/32 16384
3 IP Dest (MS) 1/128 0/32 16384
4 IP Dest (LS) 1/128 0/32 16384
5 TCP/UDP Src Port 1/128 0/32 16384
6 TCP/UDP Dest Port 1/128 0/32 16384
7 TCP Flags/Fragment 1/128 0/32 16384
Banknum Heapsize Freesize %Free
0 4172800 4172800 100
1 4128768 4128768 100
2 2818048 2818048 100
3 4194304 4194304 100
4 3342336 3309568 99
5 3670016 3637248 99
6 3342336 3309568 99
7 3342336 3309568 99
Router#

```

The following example shows a typical display for the **access-list security** option:

```
Router# show pxf cpu access security
```

```

PXF Security ACL statistics:
ACL State Tables Entries Config Fragment Redundant Memory
104 Operational 5 536 514 46 29 818Kb
105 Operational 1 4 6 0 3 7Kb
190 Operational 1 27 26 0 0 8Kb
cit01 Operational 1 26 24 12 11 9Kb
130 Unneeded
131 Unneeded
First level lookup tables:
Block Use Rows Columns Memory used
0 TOS/Protocol 18/128 5/32 16384
1 IP Source (MS) 27/128 5/32 16384
2 IP Source (LS) 36/128 5/32 16384
3 IP Dest (MS) 29/128 5/32 16384
4 IP Dest (LS) 37/128 5/32 16384
5 TCP/UDP Src Port 12/128 5/32 16384
6 TCP/UDP Dest Port 10/128 5/32 16384
7 TCP Flags/Fragment 13/128 5/32 16384
Banknum Heapsize Freesize %Free
0 4156416 3451904 83
1 4194304 4180992 99
2 4194304 4161536 99
3 4194304 4107264 97
4 3670016 3637248 99
5 3670016 3637248 99
6 3670016 3637248 99
7 3670016 3637248 99
Router#

```

Table 0-254 describes the fields shown in the **show pxf cpu access-list** command:

**Table 0-254 Field Descriptions for the show pxf cpu access-list Command**

| Field                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACL                       | Identifies the access list (ACL) in use, by either name or number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| State                     | Displays the current state of the access list: <ul style="list-style-type: none"> <li>• Copying—The ACL is in the process of being created or compiled.</li> <li>• Operational—ACL is active and filtering packets.</li> <li>• Out of acl private mem—ACL has run out of the private memory that was allocated exclusively to it.</li> <li>• Out of shared mem—ACL has run out of the memory that it shares with other ACLs.</li> <li>• Unknown Failure—ACL has failed because of an uncategorized reason.</li> <li>• Unneeded—ACL was allocated but is not currently in use.</li> </ul> |
| Tables                    | Displays the number of tables that the ACL is currently using.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Entries                   | Displays the number of table entry slots for the fields or values that the ACL is currently using to match packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Config                    | Displays the number of simple or extended entries for this ACL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Fragment                  | Displays the number of entries that were configured with the <b>fragments</b> keyword.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Redundant                 | Displays the number of duplicate entries for this ACL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Memory                    | Displays the total amount of memory, rounded up to the nearest kilobyte, that the ACL is currently using.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| First level lookup tables | Describes the blocks of memory that store the IP fields that are used to match packets for access list processing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Block                     | Identifies the block of memory used for this particular lookup table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Use                       | Describes the IP packet field that is being matched.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Rows                      | Describes the number of table rows currently in use and the total number of rows.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Columns                   | Describes the number of table columns currently in use and the total number of columns.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Memory used               | Describes the total amount of memory, in bytes, currently being used by the memory block.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Banknum                   | Identifies the block of memory used for this particular lookup table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Heapsize                  | Identifies the total amount of memory, in bytes, allocated for this block of memory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Freesize                  | Identifies the amount of memory, in bytes, that is currently available for use by this block of memory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| %Free                     | Identifies the percentage of memory that is free and available for use for this block of memory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## Buffers

The following example shows a typical display for the **buffers** option:

```
Router# show pxf cpu buffers
```

```
FP buffers
 pool size # buffer available allocate failures

 0 9216 3203 3203 0
 1 1536 6406 6406 0
 2 640 89432 89432 0
 3 256 76872 76872 0
 4 64 128120 128120 0
```

```
Router#
```

[Table 0-255](#) describes the fields shown in the **show pxf cpu buffers** command:

**Table 0-255** Field Descriptions for the show pxf cpu buffers Command

| Field             | Description                                                                                 |
|-------------------|---------------------------------------------------------------------------------------------|
| pool              | Identifies the buffer pool.                                                                 |
| size              | Displays the size, in bytes, of each buffer in this particular pool.                        |
| # buffer          | Displays the total number of buffers in this particular pool.                               |
| available         | Displays the number of buffers that are currently available.                                |
| allocate failures | Displays the number of attempts to allocate a buffer that have failed since the last reset. |

## CEF

The following example shows a typical display for the **cef** option:

```
Router# show pxf cpu cef
```

```
Shadow 10-9-5-8 Toaster Mtrie:
 97 leaves, 3104 leaf bytes, 40 nodes, 41056 node bytes
 141 invalidations
 233 prefix updates
refcounts: 10293 leaf, 10144 node
```

```
Prefix/Length Refcount Parent
0.0.0.0/0 4512
1.10.0.0/16 1665 0.0.0.0/0
1.10.0.2/32 4 1.10.0.0/16
1.10.0.3/32 4 1.10.0.0/16
1.10.37.22/32 4 1.10.0.0/16
1.10.45.16/32 4 1.10.0.0/16
1.10.85.0/24 259 1.10.0.0/16
1.10.85.0/32 4 1.10.85.0/24
1.11.0.0/16 42 0.0.0.0/0
1.11.37.0/24 4 1.11.0.0/16
127.0.0.0/8 1601 0.0.0.0/0
127.0.0.0/32 4 127.0.0.0/8
144.205.188.0/24 259 0.0.0.0/0
144.205.188.0/32 4 144.205.188.0/24
144.205.188.1/32 4 144.205.188.0/24
144.205.188.2/32 4 144.205.188.0/24
144.205.188.255/32 4 144.205.188.0/24
```

## show pxf cpu

```

164.120.151.128/25 131 0.0.0.0/0
164.120.151.128/32 4 164.120.151.128/25
164.120.151.129/32 4 164.120.151.128/25
166.135.216.255/32 4 166.135.216.128/25
221.222.140.0/22 772 0.0.0.0/0
221.222.140.0/32 4 221.222.140.0/22
221.222.141.1/32 4 221.222.140.0/22
221.222.143.255/32 4 221.222.140.0/22
223.255.254.0/24 4 0.0.0.0/0
=====
26 routes with less specific overlapping parent route

```

FP CEF/MFIB/TFIB XCM Type usage:

| Type | Name | Col | Total  | Alloc | Size | Start    | End      | BitMap0  | BitMap1  | Error |
|------|------|-----|--------|-------|------|----------|----------|----------|----------|-------|
| 0    | Root | 1   | 1000   | 1000  | 4096 | 50003100 | 503EB100 | 713AC814 | 61DFB48C | 0     |
| 1    | Node | 1   | 2048   | 2009  | 2048 | 53000000 | 53400000 | 713AC8C0 | 61DFB538 | 0     |
| 2    | Node | 1   | 32768  | 2013  | 128  | 50864000 | 50C64000 | 713AC9F0 | 61DFB668 | 0     |
| 3    | Node | 1   | 4096   | 1021  | 1024 | 53864000 | 53C64000 | 713ADA20 | 61DFC698 | 0     |
| 4    | Leaf | 1   | 524288 | 8107  | 8    | 51064000 | 51464000 | 713ADC50 | 61DFC8C8 | 0     |
| 5    | Adj  | 1   | 524288 | 3046  | 8    | 51820000 | 51C20000 | 713BDC80 | 61E0C8F8 | 0     |
| 6    | Mac  | 5   | 524288 | 2040  | 8    | 58400000 | 58800000 | 713D12C4 | 61E1FF3C | 0     |
| 7    | Load | 1   | 110376 | 4052  | 76   | 52000000 | 527FFFE0 | 713CDCB0 | 61E1C928 | 0     |
| 8    | Mdb  | 1   | 65536  | 1     | 4    | 53440000 | 53480000 | 61E66AAC | 714168CC | 0     |
| 9    | Midb | 1   | 262144 | 1     | 4    | 51C20000 | 51D20000 | 61E68ADC | 714188FC | 0     |
| 10   | TagI | 1   | 51200  | 1008  | 68   | 53480000 | 537D2000 | 714012EC | 61E4FF64 | 0     |
| 11   | TagR | 1   | 102400 | 2010  | 4    | 50800000 | 50864000 | 61E51894 | 71412C18 | 0     |

FP CEF state: 2

**Note**

If the value in the Alloc column is equal to the number in the Total column, then the PXF has run out of its allocated memory for that level and the CEF entries for that particular level have been exhausted.

Table 0-256 describes the fields shown in the **show pxf cpu cef** command:

**Table 0-256** Field Descriptions for the show pxf cpu cef Command

| Field                            | Description                                                                                                                                                                                                                            |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Shadow 10-9-5-8<br>Toaster Mtrie | Header for the memory used by the CEF switching tables, which use the optimized multiway tree (Mtrie) data structure format.                                                                                                           |
| leaves                           | Number of leaves in the CEF Mtrie table.                                                                                                                                                                                               |
| leaf bytes                       | Number of bytes used by the leaves in the Mtrie table.                                                                                                                                                                                 |
| nodes                            | Number of nodes in the Mtrie table.                                                                                                                                                                                                    |
| node bytes                       | Number of bytes used by the nodes in the Mtrie table.                                                                                                                                                                                  |
| invalidations                    | Number of times an existing entry in the adjacency table was invalidated because of updated information.                                                                                                                               |
| prefix updates                   | Number of updates made to the adjacency table.                                                                                                                                                                                         |
| refcounts                        | Number of references (leaves and nodes) to an adjacency that are currently stored in the adjacency table. There is one reference for each corresponding entry in the CEF table, plus a few others for maintenance and system purposes. |
| Prefix/Length                    | IP prefix and length (IP network or host number, with subnet) that is in the CEF adjacency table.                                                                                                                                      |
| Refcount                         | Number of times this prefix is referenced in the adjacency table.                                                                                                                                                                      |

**Table 0-256** Field Descriptions for the show pxf cpu cef Command (continued)

| Field                                                                                                                                 | Description                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Parent                                                                                                                                | Parent of this prefix's leaf or node entry in the adjacency table.                  |
| <b>FP CEF/MFIB/TFIB XCM Type usage—The following fields display the memory usage of the shadow forwarding information base (FIB).</b> |                                                                                     |
| Type                                                                                                                                  | Level number of this particular memory block.                                       |
| Name                                                                                                                                  | Identifier for this particular memory block.                                        |
| Total                                                                                                                                 | Total number of nodes available on each level and changes to other data structures. |
| Alloc                                                                                                                                 | Number of nodes currently allocated.                                                |
| Start, End                                                                                                                            | Starting and ending addresses for the memory block.                                 |
| Error                                                                                                                                 | Number of errors discovered in the memory block.                                    |

**Context**

The following example shows a typical display for the **context** option, which displays performance statistics for the PXF processors over the past 1-minute, 5-minute, and 60-minute periods:

Router# **show pxf cpu context**

```

FP context statistics count rate

 feed_back 2002946946 645161
 new_work 3992307360 1293715
 null 2261726736 708206

 2647082

FP average context/sec 1min 5min 60min

 feed_back 679377 707217 191844 cps
 new_work 1358758 1414842 391367 cps
 null 587560 520274 2171829 cps

 Total 2625695 2642333 2755040 cps

FP context utilization 1min 5min 60min

 Actual 77 % 80 % 21 %
 Theoretical 65 % 67 % 18 %
 Maximum 84 % 84 % 88 %

```

Router#

**Note**

The **show pxf cpu context** command displays more useful information on the processor's performance than the **show processor cpu command** that is used on other platforms.

This display shows statistics that are based on three counters on the PXF processors:

- **feed\_back**—Incremented each time the processor requires another processor cycle to process a packet. Each PXF processor contains 8 columns that perform different packet header processing tasks, such as ACL processing or QoS processing. A typical IP packet passes through all 8 columns

only once, but some types of packets can require more than one pass through these columns, and each additional pass through the PXF processor is referred to as feedback. This counter represents the amount of traffic that cannot be processed in an optimal manner.

- **new\_work**—Incremented for new packets that come into the PXF pipeline. This counter represents a snapshot of the amount of incoming traffic being processed by the processor.
- **null**—Incremented for every context during which the PXF pipe is not processing traffic. This counter represents the processor's potential to handle additional traffic. As the processor becomes more busy, the value for null decreases until it becomes 0, at which point the processor has reached its maximum usage.

Table 0-257 describes the fields shown in the **show pxf cpu context** command:

**Table 0-257 Field Descriptions for the show pxf cpu context Command**

| Field                         | Description                                                                                                                                                                                                                                                                                                                    |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FP context statistics</b>  |                                                                                                                                                                                                                                                                                                                                |
| feed_back                     | Displays the current value for the feed_back counter and the rate that the counter is increasing per second (the difference between the current value and the previous value divided by the time period between the two).                                                                                                      |
| new_work                      | Displays the current value for the new_work counter and the rate that the counter is increasing per second (the difference between the current value and the previous value divided by the time period between the two).                                                                                                       |
| null                          | Displays the current value for the null counter and the rate that the counter is increasing per second (the difference between the current value and the previous value divided by the time period between the two).                                                                                                           |
| <b>FP average context/sec</b> |                                                                                                                                                                                                                                                                                                                                |
| feed_back                     | Displays the rate, in terms of the number of contexts per second (cps) for the feed_back counter for the last 1-minute, 5-minute, and 60-minute time periods.                                                                                                                                                                  |
| new_work                      | Displays the rate, in terms of the number of contexts per second (cps) for the new_work counter for the last 1-minute, 5-minute, and 60-minute time periods.                                                                                                                                                                   |
| null                          | Displays the rate, in terms of the number of contexts per second (cps) for the null counter for the last 1-minute, 5-minute, and 60-minute time periods.                                                                                                                                                                       |
| <b>FP context utilization</b> |                                                                                                                                                                                                                                                                                                                                |
| Actual                        | Displays the actual percentage of processor usage per second, compared to the theoretical maximum, for the last 1-minute, 5-minute, and 60-minute time periods. The value for Actual = $(\text{new\_work} + \text{feed\_back}) * 100 / (\text{new\_work} + \text{feed\_back} + \text{null})$ .                                 |
| Theoretical                   | Displays the percentage of processor usage compared to the ideal theoretical capacities for the last 1-minute, 5-minute, and 60-minute time periods. The value for Theoretical = $(\text{new\_work} + \text{feed\_back}) * 100 / 3125000$ . (The theoretical maximum for the PXF processors is 3,125,000 contexts per second.) |
| Maximum                       | Displays the actual maximum percentage of processor usage that has occurred for the last 1-minute, 5-minute, and 60-minute time periods. The value for Actual = $(\text{new\_work} + \text{feed\_back} + \text{null}) * 100 / 3125000$ .                                                                                       |

## Mroute

The following example shows a typical display for the **mroute** option:

```
Router# show pxf cpu mroute
```

```
Shadow G/SG[5624]: s: 0.0.0.0 g: 224.0.1.40 uses: 0 bytes 0 flags: [D] LNJ
Interface vcci offset rw_index mac_header
In : 0 0x000004

Shadow G/SG[3195]: s: 0.0.0.0 g: 234.5.6.7 uses: 0 bytes 0 flags: [5] NJ
Interface vcci offset rw_index mac_header
In : 0 0x000008
Out: Cable5/1/0 5 0x00002C 1B 00000026800001005E05060700010
Out: Cable6/1/1 9 0x000028 1A 00000026800001005E05060700010
Out: Cable6/0/0 6 0x000024 19 00000026800001005E05060700010
Out: Cable5/0/0 3 0x000020 18 00000026800001005E05060700010
Out: Cable7/0/0 A 0x00001C 17 00000026800001005E05060700010
Out: Cable7/1/1 C 0x000018 16 00000026800001005E05060700010
Out: Cable7/1/0 B 0x000014 15 00000026800001005E05060700010
Out: Cable6/1/0 8 0x000010 14 00000026800001005E05060700010
Out: Cable6/0/1 7 0x00000C 13 00000026800001005E05060700010
Out: Cable5/0/1 4 0x000008 12 00000026800001005E05060700010
```

```
Router#
```

[Table 0-258](#) describes the fields shown in the **show pxf cpu mroute** command:

**Table 0-258** Field Descriptions for the **show pxf cpu mroute** Command

| Field      | Description                                                                                                                                                                                                                                                            |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface  | Cable interface or subinterface.                                                                                                                                                                                                                                       |
| vcci       | Virtually Cool Common Index (VCCI) for this cable interface or subinterface. The VCCI is an index that uniquely identifies every interface or subinterface on the PXF processor, and that quickly maps that interface to the appropriate set of services and features. |
| rw index   | Index used to read and write into the multicast table for this entry.                                                                                                                                                                                                  |
| mac_header | MAC header that is used when rewriting the packet for output.                                                                                                                                                                                                          |

## Queue

The following example shows a typical display for the **queue** option, which displays the chassis-wide counters for the PXF pipeline counters that show drops on the output side of the processor:

```
Router# show pxf cpu queue
```

```
FP queue statistics for RP
Queue number 0 Shared
 wq_avg_qlen 0 wq_flags_pd_offset 1B48001
 wq_drop_factor 74
 wq_buffer_drop 0 wq_limit_drop 0
 wq_invalid_enq_wqb_drop 0 wq_invalid_deq_wqb_drop 0
 wq_rnd_pkt_drop 0 wq_rnd_byte_drop 0
 wq_static_qlen_drop 0
 wq_len 0

 Packet xmit 804833 Byte xmit 487438911
Queue number 15 Shared High priority
 wq_avg_qlen 0 wq_flags_pd_offset 1BC8001
 wq_drop_factor 174
```

## ■ show pxf cpu

```

wq_buffer_drop 0 wq_limit_drop 0
wq_invalid_enq_wqb_drop 0 wq_invalid_deq_wqb_drop 0
wq_rnd_pkt_drop 0 wq_rnd_byte_drop 0
wq_static_qlen_drop 0
wq_len 0

Packet xmit 69647 Byte xmit 41230926

```

Router#

The following example shows a typical display for the **queue** option for a particular cable interface:

Router# **show pxf cpu queue c6/0/0**

FP queue statistics for Cable5/0/0

FP queue statistics for Cable6/0/0

```

Queue algorithm 0x0
Queue number 0 Shared
wq_avg_qlen 0 wq_flags_pd_offset 18A0001
wq_drop_factor 40
wq_buffer_drop 0 wq_limit_drop 0
wq_invalid_enq_wqb_drop 0 wq_invalid_deq_wqb_drop 0
wq_rnd_pkt_drop 0 wq_rnd_byte_drop 0
wq_static_qlen_drop 0
wq_len 0

Packet xmit 56414 Byte xmit 14322357
Queue number 15 Shared High priority
wq_avg_qlen 0 wq_flags_pd_offset 18A8001
wq_drop_factor 1000
wq_buffer_drop 0 wq_limit_drop 0
wq_invalid_enq_wqb_drop 0 wq_invalid_deq_wqb_drop 0
wq_rnd_pkt_drop 0 wq_rnd_byte_drop 0
wq_static_qlen_drop 0
wq_len 0

Packet xmit 0 Byte xmit 0

```

Router#

### Schedule

The following example shows a typical display for the **schedule summary** option:

Router# **show pxf cpu schedule summary**

```

FP average dequeue schedule rate in pps
Interface Level 1 Level 2 maximum 1min 5min 60min

Total 32 / 32 1 / 1 3125000 0 % 0 % 0 %

```

Router#

The following example shows a typical display for the **schedule** option for a particular interface:

Router# **show pxf cpu schedule c5/0/0**

```

FP average dequeue schedule rate in pps
Interface Level 1 Level 2 maximum 1min 5min 60min

Cable5/0/0 1 / 32 1 / 1 97656 0 % 0 % 0 %

```



Router#

Table 0-259 describes the fields shown in the **show pxf cpu schedule** command:

**Table 0-259 Field Descriptions for the show pxf cpu schedule Command**

| Field     | Description                                                                                                                           |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------|
| Interface | Identifies the cable interface or subinterface.                                                                                       |
| Level 1   | Displays the number of occupied level 1 (port) wheel slots and the total number of wheel slots for this interface or subinterface.    |
| Level 2   | Displays the number of occupied level 2 (channel) wheel slots and the total number of wheel slots for this interface or subinterface. |
| maximum   | Displays the maximum number of packet dequeues per second.                                                                            |
| 1 min     | Displays the dequeue rate for the last 1-minute period.                                                                               |
| 5 min     | Displays the dequeue rate for the last 5-minute period.                                                                               |
| 60 min    | Displays the dequeue rate for the last 60-minute period.                                                                              |

### Statistics

The following example shows a typical display for the **statistics diversion** option, which shows chassis-wide statistics for PXF diversions, which occur whenever the PXF processor sends a packet to the main route processor for special processing (such as errored packets, address resolution protocol (ARP) packets, point-to-point protocol (PPP) control packets, an unsupported Layer 2 packet header, and so forth).

Router# **show pxf cpu statistics diversion**

```

Diversion Cause Stats:
 local = 263171
 dest = 0
 option = 0
 protocol = 0
 encap = 541943
 oam f5 seg= 0
 oam f5 ete= 0
 oam f4 seg= 0
 oam f4 ete= 0
 atm ilmi = 0
 fr_term = 0
 comp = 0
 ip_sanity = 0
 ip_bcast = 0
 ip_dest = 0
 fib_punt = 0
 mtu = 0
 arp = 127
 rarp = 0
 icmp = 0
 dsap_ssap = 0
 acl = 0
 divert = 0
 no_group = 0
 direct = 0
 local_mem = 0
 p2p_prune = 0
 assert = 0
 dat_prune = 0

```

show pxf cpu

```

join_spt = 0
null_out = 0
igmp = 69
register = 0
no_fast = 136
ipc_resp = 0
keepalive = 0
min_mtu = 0
icmp_frag = 0
icmp_bad = 0
mpls_ttl = 0
tfib = 0
multicast = 69656
clns_isis = 0
fr_lmi = 0
ppp_cntrl = 0

```

Interface specific To RP punt statistics

|                      |              |              |          |
|----------------------|--------------|--------------|----------|
| GigabitEthernet1/0/0 | 1000 packets | 113946 bytes | RP Rx    |
| GigabitEthernet1/0/0 | 1000 packets | 113946 bytes | Proc Enq |
| Cable5/1/0           | 0 packets    | 0 bytes      | RP Rx    |
| Cable5/1/0           | 0 packets    | 0 bytes      | Proc Enq |
| Cable5/1/1           | 0 packets    | 0 bytes      | RP Rx    |
| Cable5/1/1           | 0 packets    | 0 bytes      | Proc Enq |
| Cable6/0/0           | 32 packets   | 4509 bytes   | RP Rx    |
| Cable6/0/0           | 31 packets   | 3914 bytes   | Proc Enq |
| Cable6/0/1           | 3 packets    | 1234 bytes   | RP Rx    |
| Cable6/0/1           | 3 packets    | 1222 bytes   | Proc Enq |
| Cable6/0/2           | 0 packets    | 0 bytes      | RP Rx    |
| Cable6/0/2           | 0 packets    | 0 bytes      | Proc Enq |
| Cable6/0/3           | 0 packets    | 0 bytes      | RP Rx    |
| Cable6/0/3           | 0 packets    | 0 bytes      | Proc Enq |
| Cable6/0/4           | 0 packets    | 0 bytes      | RP Rx    |
| Cable6/0/4           | 0 packets    | 0 bytes      | Proc Enq |
| Cable7/0/0           | 0 packets    | 0 bytes      | RP Rx    |
| Cable7/0/0           | 0 packets    | 0 bytes      | Proc Enq |
| Cable8/0/0           | 0 packets    | 0 bytes      | RP Rx    |
| Cable8/0/0           | 0 packets    | 0 bytes      | Proc Enq |
| Cable8/0/1           | 0 packets    | 0 bytes      | RP Rx    |
| Cable8/0/1           | 0 packets    | 0 bytes      | Proc Enq |

Router#



**Note**

As shown in this display, the majority of dropped packets should typically be either local (sent to the router for routing), encap (encapsulated for another protocol), or multicast (IP multicast traffic). Also, the “Interface specific To RP punt statistics” counters appear only in Cisco IOS Release 12.3(X)BC and later releases.

The following example shows a typical display for the **statistics drop** option, which shows chassis-wide PXF drop statistics:

Router# **show pxf cpu statistics drop**

```

FP drop statistics
 packets bytes
icmp_on_icmp 0 0
ipc_cmd_invalid 0 0
icmp_unrch_interval 294 31164
bad_tag_opcode 0 0
bad_ch_handle 0 0
no_touch_from_rp 0 0
dst_ip_is_mcast 0 0
ib_re_bit 0 0
encap_too_big 0 0
no_tfib_route 0 0
mc_disabled 0 0
mc_rpf_failed 0 0
mc_prune_rate_limit 0 0
mc_null_oif 0 0
bad_drop_code 0 0
cobalt_re[00] 0 0
 [01] 0 0
 [02] 0 0
 [03] 0 0
 [04] 0 0
 [05] 0 0
 [06] 0 0
 [07] 0 0
 [08] 0 0
 [09] 0 0
 [10] 0 0
 [11] 0 0
 [12] 0 0
 [13] 0 0
 [14] 0 0
 [15] 0 0
 [16] 0 0
 [17] 0 0
null_config[00] 0 0
 [01] 0 0
 [02] 0 0
 [03] 0 0
 [04] 0 0
 [05] 0 0
 [06] 0 0
 [07] 1 362
 [08] 0 0
 [09] 0 0
 [10] 0 0
 [11] 0 0
 [12] 0 0
 [13] 0 0
 [14] 0 0
 [15] 0 0
 [16] 0 0
 [17] 0 0
inval_ib_resource[00] 0 0
 [01] 0 0
 [02] 0 0
 [03] 0 0
 [04] 0 0
 [05] 0 0
 [06] 0 0
 [07] 0 0
 [08] 0 0
 [09] 0 0

```

```

[10] 0 0
[11] 0 0
[12] 0 0
[13] 0 0
[14] 0 0
[15] 0 0
[16] 0 0
[17] 0 0
[18] 0 0
[19] 0 0
[20] 0 0
[21] 0 0
[22] 0 0
[23] 0 0
[24] 0 0
[25] 0 0
[26] 0 0
[27] 0 0
[28] 0 0
[29] 0 0
[30] 0 0
[31] 0 0
master drop count 794

```

Router#

The following example shows a typical display for the **statistics drop** option for a particular cable interface, which shows the input-side drop statistics for that particular interface:

Router# **show pxf cpu statistics drop c7/1/0**

```

FP drop statistics for Cable7/1/0
 packets bytes
vcci undefined 0 0
vcci B
 bad hdlc addr 0 0
 mac length mismatch 0 0
 bad ip checksum 0 0
 ip length mismatch 0 0
 ip length short 0 0
 ip length long 0 0
 ip version mismatch 0 0
 bad rpf 0 0
 acl failure 0 0
 police 0 0
 ttl 0 0
 unreachable 0 0
 mlp_frag_received 0 0
 mlp_unexpected_pkt 0 0
 df_multicast 0 0
 encap_not_supported 0 0
 mtu_too_wee 0 0
 mtu_too_big 0 0
 atm_fp_rx_cell_size_err 0 0

Data Received 0 0

```

Router#

The following example shows a typical display for the **statistics ip** option, which displays chassis-wide PXF forwarding statistics for IP, multicast, fragmented, and ICMP packets:

Router# **show pxf cpu statistics ip**

```

FP ip statistics
 dropped 0
 forwarded 1291
 punted 11393
 input_packets 14049
 icmps_created 1365
 noadjacency 0
 noroute 300
 unicast_rpf 0
 unresolved 0

FP ip multicast statistics
 mcast total 69665
 mcast drops 0
 mcast rpf 0
 mcast inputacl 0
 mcast outputacl 0
 mcast punts 69665
 mcast switched 0
 mcast failed 0

FP ip frag statistics
 packets 0
 fragments 0
 fragfail 0
 dontfrag 0
 mcdontfrag 0

FP icmp statistics
 unreachable 0
 ttlsent 0
 echorep sent 0
 echorc v 0
 checksumerr 0

Router#

```

**Note**

The `noroute` counter increases whenever the router drops a packet because its destination IP address is 0.0.0.0. This counter also increases whenever the Cisco Express Forwarding (CEF) adjacency tables drop a packet because it has a null, discard, or drop adjacency.

**Subblocks**

The following example shows a typical display for the **subblocks** option for all interfaces:

```
Router# show pxf cpu subblocks
```

| Interface            | Status   | ICB   | WQB_ID | Fwding  | Encap | VCCI map | VCCI |
|----------------------|----------|-------|--------|---------|-------|----------|------|
| POS1/0/0             | initiali | 6000  | 6146   | disable | 5     | 81800000 | E    |
| GigabitEthernet3/0/0 | reset    | E000  | 6148   | disable | 1     | 81800004 | 1    |
| GigabitEthernet4/0/0 | up       | 12000 | 6150   | PXF     | 1     | 81800008 | 2    |
| Cable5/0/0           | down     | 14000 | 4096   | disable | 59    | 81805400 | 3    |
| Cable5/0/1           | down     | 14100 | 4097   | disable | 59    | 81805C00 | 4    |
| Cable5/1/0           | up       | 16000 | 4098   | PXF     | 59    | 81806400 | 5    |
| Cable6/0/0           | up       | 18000 | 4099   | PXF     | 59    | 81806C00 | 6    |
| Cable6/0/1           | up       | 18100 | 4100   | PXF     | 59    | 81807400 | 7    |
| Cable6/1/0           | up       | 1A000 | 4101   | PXF     | 59    | 81807C00 | 8    |
| Cable6/1/1           | up       | 1A100 | 4102   | PXF     | 59    | 81808400 | 9    |
| Cable7/0/0           | up       | 1C000 | 4103   | PXF     | 59    | 81808C00 | A    |
| Cable7/1/0           | up       | 1E000 | 4104   | PXF     | 59    | 81809400 | B    |
| Cable7/1/1           | up       | 1E100 | 4105   | PXF     | 59    | 81809C00 | C    |

show pxf cpu

```
Cable7/1/1.1 up 1E100 4105 PXF 59 8180A400 D

Router#
```

The following example shows a typical display for the **subblocks** option for a particular cable interface:

```
Router# show pxf cpu subblocks c7/1/1

Cable7/1/1 is up
 ICB = 1E100, WQB_ID = 4105, interface PXF, enabled
 MAC Domain = 2
 IOS encapsulation type 59 MCNS
 Min mtu: 18 Max mtu: 1538
 VCCI mactable location = 81809C00
 VCCI C
 icmp ipaddress 0.0.0.0 timestamp 0

Router#
```

[Table 0-260](#) describes the fields shown in the display for the **show pxf cpu subblocks** command.

**Table 0-260** *show pxf cpu subblocks Field Descriptions*

| Field      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface  | Identifies the interface or subinterface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Status     | Displays the status of the interface: <ul style="list-style-type: none"> <li>Administ—The interface has been shut down and is in the administrative down state.</li> <li>Deleted—The subinterface has been removed from the router’s configuration.</li> <li>Down—The interface is down because of a cable or other connectivity problem.</li> <li>Initiali—The interface is in the process of initializing.</li> <li>Reset—The interface is currently being reset.</li> <li>Up—The interface is up and passing traffic.</li> </ul> |
| ICB        | Displays the Interface Control Block (ICB) that is mapped to this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MAC Domain | Displays the DOCSIS-layer domain for this interface or subinterface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| WQB_ID     | Displays the Work Queue Block (WQB) identifier for this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Fwding     | Displays whether traffic is being forwarded (PXF) or not (disable).                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 0-260** *show pxf cpu subblocks Field Descriptions*

| Field    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Encap    | <p>Identifies the type of encapsulation being used on the interface. The most common types of encapsulation are:</p> <ul style="list-style-type: none"> <li>0 = None</li> <li>1 = Ethernet ARPA</li> <li>2 = Ethernet SAP</li> <li>3 = 802.2 SNAP</li> <li>5 = Serial, raw HDLC</li> <li>8 = Serial, LAPB</li> <li>9 = Serial, X.25</li> <li>20 = Frame Relay</li> <li>21 = SMDS</li> <li>22 = MAC level packets</li> <li>27 = LLC 2</li> <li>28 = Serial, SDLC (primary)</li> <li>30 = Async SLIP encapsulation</li> <li>33 = ATM interface</li> <li>35 = Frame Relay with IETF encapsulation</li> <li>42 = Dialer encapsulation</li> <li>46 = Loopback interface</li> <li>51 = ISDN Q.921</li> <li>59 = DOCSIS (previously known as MCNS)</li> <li>61 = Transparent Mode</li> <li>62 = TDM clear channel</li> <li>64 = PPP over Frame Relay</li> <li>65 = IEEE 802.1Q</li> <li>67 = LAPB terminal adapter</li> <li>68 = DOCSIS Cable Modem</li> </ul> |
| VCCI map | Displays the memory address for the Virtually Cool Common Index (VCCI) map table for this particular VCCI. The VCCI is an index that uniquely identifies every interface or subinterface on the PXF processor and that quickly maps that interface to the appropriate set of services and features.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| VCCI     | Identifies the VCCI (in hexadecimal) that is assigned to the interface or subinterface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Related Commands**

| Command                         | Description                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>clear pxf</b>                | Clears the direct memory access (DMA) and error checking and correcting (ECC) error counters on the PXF processor. |
| <b>debug pxf</b>                | Enables debugging of the PXF subsystems on the active PRE1 module on the Cisco uBR10012 router.                    |
| <b>show pxf cable</b>           | Displays information about the multicast echo and packet intercept features for one or all cable interfaces.       |
| <b>show pxf cable interface</b> | Displays information about a particular service ID (SID) on a particular cable interface.                          |
| <b>show pxf dma</b>             | Displays information for the current state of the PXF DMA buffers, error counters, and registers.                  |

| Command                   | Description                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------|
| <b>show pxf microcode</b> | Displays identifying information for the microcode being used on the processor.              |
| <b>show pxf xcm</b>       | Displays the current state of ECC for the External Column Memory (XCM) on the PXF processor. |
| <b>show ip mroute</b>     | Displays the contents of the IP multicast routing table.                                     |



# show pxf cpu drl-trusted-sites

To display the configured Divert-Rate-Limit (DRL) trusted sites, use the **show pxf cpu drl-trusted-sites** command in privileged EXEC mode.

**show pxf cpu drl-trusted-sites**

## Syntax Description

This command has no keywords or arguments.

## Command Default

No default behavior or values

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCB | This command was introduced. |

## Usage Guidelines

Use this command to display the configured DRL trusted sites.

## Examples

The following example shows sample output for the **show pxf cpu drl-trusted-sites** command:

```
Router# show pxf cpu drl-trusted-sites
Divert-Rate-Limit Trusted-Site list
 IP-addr IP-addr mask ToS ToS mask VRF
 50.0.0.0 255.255.255.0 0x18 0xF8 global internet
 50.0.1.0 255.255.0.0 0x01 0xFF all
 60.0.1.0 255.255.255.0 0x18 0xF8 blue
```

[Table 261](#) describes the significant fields shown in the display.

**Table 261** *show pxf cpu drl-trusted-sites Field Descriptions*

| Field        | Description                                                                   |
|--------------|-------------------------------------------------------------------------------|
| IP-addr      | The IP address of the host or CM.                                             |
| IP-addr mask | The IP address mask of the host or CM.                                        |
| ToS          | Type of Service value to be matched by the filter.                            |
| ToS Mask     | Type of Service mask to be matched by the filter.                             |
| VRF          | Name of the virtual interface that has been configured for DRL trusted sites. |

## Related Commands

| Command                                             | Description                                                                                    |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>show pxf cpu statistics<br/>drl cable-wan-ip</b> | This command displays the parallel express forwarding (PXF) DRL cable/wan-ip statistics table. |
| <b>show pxf cpu statistics<br/>drl wan-non-ip</b>   | This command displays the PXF DRL wan-non-ip statistics.                                       |

# show pxf cpu queue

To display parallel express forwarding (PXF) queueing and link queue statistics, use the **show pxf cpu queue** command in privileged EXEC mode.

**show pxf cpu queue** [*interface* | *QID* | **summary**]

## Cisco uBR10012 Universal Broadband Router

**show pxf cpu queue** [*interface* | *QID*]

|                    |                  |                                                                                                                                                                                                                                                                                |
|--------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <i>interface</i> | (Optional) The interface for which you want to display PXF queueing statistics. This displays PXF queueing statistics for the main interface and all subinterfaces and permanent virtual circuits (PVCs). It also displays packets intentionally dropped due to queue lengths. |
|                    | <i>QID</i>       | (Optional) The queue identifier.                                                                                                                                                                                                                                               |
|                    | <b>summary</b>   | (Optional) Displays queue scaling information such as:                                                                                                                                                                                                                         |
|                    |                  | <ul style="list-style-type: none"><li>• Number of queues and recycled queues.</li><li>• Number of available queue IDs (QIDs).</li><li>• Number of packet buffers, recycled packet buffers, and free packet buffers.</li></ul>                                                  |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

| Command History | Release     | Modification                                                                                                                                                                                      |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2S       | This command was introduced.                                                                                                                                                                      |
|                 | 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                                    |
|                 | 12.3(7)XI1  | This command was integrated into Cisco IOS Release 12.3(7)XI1.                                                                                                                                    |
|                 | 12.3(23)BC1 | The “Link Queues” output field for dynamic bandwidth sharing-enabled modular cable and wideband cable interfaces was added on the Cisco uBR10012 universal broadband router.                      |
|                 | 12.2(33)SB  | This command was modified for virtual access interfaces (VAIs) and the output was modified for the <b>summary</b> option, and implemented on the Cisco 10000 series router for the PRE3 and PRE4. |
|                 | 12.2(33)SCB | The output of this command has been updated or re-arranged (compared to the VTMS version) for DOCSIS Weighted Fair Queuing (WFQ) Scheduler feature and implemented on the Cisco uBR10012 router.  |

|                  |                                                                                                                         |
|------------------|-------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | When neither the interface or QID is specified, the command displays queuing statistics for the route processors (RPs). |
|------------------|-------------------------------------------------------------------------------------------------------------------------|

### Cisco 10000 Series Router

The Cisco 10000 series router high-speed interfaces work efficiently to spread traffic flows equally over the queues. However, using single traffic streams in a laboratory environment might result in less-than-expected performance. To ensure accurate test results, test the throughput of the Gigabit Ethernet, OC-48 POS, or ATM uplink with multiple source or destination addresses. To determine if traffic is being properly distributed, use the **show pxf cpu queue** command.

In Cisco IOS Release 12.2(33)SB and later releases, the router no longer allows you to specify a virtual access interface (VAI) as **viX.Y** in the **show pxf cpu queue** command. Instead, you must spell out the VAI as **virtual-access**.

For example, the router accepts the following command:

```
Router# show pxf cpu queue virtual-access2.1
```

In releases prior to Cisco IOS Release 12.2(33)SB, the router accepts the abbreviated form of the VAI. For example, the router accepts the following command:

```
Router# show pxf cpu queue vi2.1
```

In Cisco IOS Release 12.2(33)SB and later releases, the output from the **show pxf cpu queue interface summary** command displays only the physical interface and the number of logical links. The output does not display the number of priority queues, class queues, and so on. This modification applies to the PRE3 and PRE4.

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If dynamic bandwidth sharing (DBS) is enabled, the link queue information that is displayed refers to the specific type of interface that is configured—modular cable or wideband cable. The **summary** keyword option is not supported for the Cisco uBR10012 universal broadband router for wideband cable or modular cable interfaces. The **ATM** interface output is not available for this router.

See [Table 262](#) for descriptions of the **interface** keyword fields.

**Table 262** *show pxf cpu queue Interface Option Field Descriptions*

| Field           | Description                                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <0-131071>      | QID (queue identifier)                                                                                                                           |
| ATM             | Asynchronous transfer mode interface<br><b>Note</b> The ATM interface output is not available for the Cisco uBR10012 universal broadband router. |
| BVI             | Bridge-group virtual interface                                                                                                                   |
| Bundle          | Cable virtual bundle interface                                                                                                                   |
| CTunnel         | CTunnel interface                                                                                                                                |
| Cable           | Cable modem termination service (CMTS) interface                                                                                                 |
| DTI             | Digital trunk interface                                                                                                                          |
| Dialer          | Dialer interface                                                                                                                                 |
| Ethernet        | IEEE 802.3                                                                                                                                       |
| FastEthernet    | FastEthernet IEEE 802.3                                                                                                                          |
| GigabitEthernet | GigabitEthernet IEEE 802.3z                                                                                                                      |
| Group-Async     | Async group interface                                                                                                                            |
| Loopback        | Loopback interface                                                                                                                               |

**Table 262** *show pxf cpu queue Interface Option Field Descriptions (continued)*

| Field             | Description                                          |
|-------------------|------------------------------------------------------|
| MFR               | Multilink frame relay bundle interface               |
| Modular-Cable     | Modular cable interface                              |
| Multilink         | Multilink group interface                            |
| Null              | Null interface                                       |
| Port-channel      | Ethernet channel of interfaces                       |
| RP                | Forwarding path (FP) to route processing (RP) queues |
| Tunnel            | Tunnel interface                                     |
| Vif               | Pragmatic general multicast (PGM) host interface     |
| Virtual-Template  | Virtual template interface                           |
| Virtual-TokenRing | Virtual token ring                                   |
| WB-SPA            | line card to line card (LC-LC) queues                |
| Wideband-Cable    | Wideband CMTS interface                              |

### Examples

The following example shows PXF queueing statistics for an ATM interface when a QID is not specified. The sample output includes the dropped and dequeued packets for the VCs, and for classes associated with sessions that inherit queues from VCs.

Router# **show pxf cpu queue atm 5/0/2**

VCCI 2517: ATM non-aggregated VC 1/229, VCD 1, Handle 1, Rate 500 kbps

| VCCI/ClassID | ClassName     | QID | Length/Max | Res | Dequeues | Drops |
|--------------|---------------|-----|------------|-----|----------|-------|
| 0 2517/0     | class-default | 269 | 0/4096     | 11  | 3        | 0     |
| 0 2517/31    | pak-priority  | 268 | 0/32       | 11  | 4        | 0     |

Queues Owned but Unused by VC (inheritable by sessions)

| ClassID | ClassName     | QID | Length/Max | Res | Dequeues | Drops |
|---------|---------------|-----|------------|-----|----------|-------|
| 0       | class-default | 275 | 0/32       | 11  | 100      | 0     |
| 31      | pak-priority  | 268 | 0/32       | 11  | 4        | 0     |

VCCI 2517: ATM non-aggregated VC 1/233, VCD 4, Handle 4, Rate 50 kbps

| VCCI/ClassID | ClassName     | QID | Length/Max | Res | Dequeues | Drops |
|--------------|---------------|-----|------------|-----|----------|-------|
| 0 2517/0     | class-default | 269 | 0/4096     | 11  | 3        | 0     |
| 0 2517/31    | pak-priority  | 268 | 0/32       | 11  | 4        | 0     |

Queues Owned but Unused by VC (inheritable by sessions)

| ClassID | ClassName     | QID | Length/Max | Res | Dequeues | Drops |
|---------|---------------|-----|------------|-----|----------|-------|
| 0       | class-default | 274 | 0/32       | 11  | 0        | 0     |
| 31      | pak-priority  | 268 | 0/32       | 11  | 4        | 0     |

VCCI 2520: ATM non-aggregated VC 1/232, VCD 3, Handle 3, Rate 500 kbps

| VCCI/ClassID | ClassName     | QID | Length/Max | Res | Dequeues | Drops |
|--------------|---------------|-----|------------|-----|----------|-------|
| 0 2520/0     | class-default | 273 | 0/32       | 11  | 0        | 0     |
| 0 2520/31    | pak-priority  | 268 | 0/32       | 11  | 4        | 0     |

VCCI 2519: ATM non-aggregated VC 1/231, VCD 2, Handle 2, Rate 500 kbps

| VCCI/ClassID | ClassName     | QID | Length/Max | Res | Dequeues | Drops |
|--------------|---------------|-----|------------|-----|----------|-------|
| 0 2519/0     | class-default | 272 | 0/32       | 11  | 0        | 0     |
| 0 2519/31    | pak-priority  | 268 | 0/32       | 11  | 4        | 0     |

The following example displays PXF queuing statistics for QID 267:

Router# **show pxf cpu queue 267**

```

ID : 267
Priority : Lo
CIR (in-use/configured) : 0/65535
EIR (in-use/configured) : 0/0
MIR (in-use/configured) : 0/65535
Maximum Utilization configured : no
Link : 2
Flowbit (period/offset) : 32768/32768
Burst Size : 1024 bytes
Bandwidth : 133920 Kbps
Channel : 0
Packet Descriptor Base : 0x00000100
ML Index : 0
Length/Average/Alloc : 0/0/32
Enqueues (packets/octet) : 293352/9280610
Dequeues (packets/octet) : 293352/9280610
Drops (tail/random/max_threshold) : 0/0/0
Drops (no_pkt_handle/buffer_low) : 0/0
WRED (weight/avg_smaller) : 0/0
WRED (next qid/drop factor) : 0/0
WRED (min_threshold/max_threshold/scale/slope):
precedence 0 : 0/0/0/0
precedence 1 : 0/0/0/0
precedence 2 : 0/0/0/0
precedence 3 : 0/0/0/0
precedence 4 : 0/0/0/0
precedence 5 : 0/0/0/0
precedence 6 : 0/0/0/0
precedence 7 : 0/0/0/0

```

### Cisco uBR10012 Universal Broadband Router

The following examples show link queue information for specific wideband cable and modular cable interfaces when dynamic bandwidth sharing is enabled.

#### Modular Cable Interface

```

Router(config)# interface modular-cable 1/0/0:1
.
.
.

```

```

Router(config-if)# cable dynamic-bw-sharing
.
.
.

```

Router# **show pxf cpu queue modular-cable 1/0/0:1**

```

Link Queues :
QID CIR(act/conf) EIR MIR RF Chan. Status

```

```
420 19661/19661 1/1 65535/65535 0 Inactive
```

### Wideband Cable Interface

```
Router(config)# interface wideband-cable 1/0/0:0
```

```
.
.
.
```

```
Router(config-if)# cable dynamic-bw-sharing
```

```
.
.
.
```

```
Router# show pxf cpu queue wideband-cable 1/0/0:0
```

```
Link Queues :
```

| QID | CIR(act/conf) | EIR | MIR         | RF Chan. | Status   |
|-----|---------------|-----|-------------|----------|----------|
| 419 | 32768/32768   | 1/1 | 65535/65535 | 0        | Inactive |
| 566 | 19661/19661   | 1/1 | 65535/65535 | 1        | Inactive |

The following example shows service flow queue information for modular cable interfaces.

```
Router# show pxf cpu queue modular-cable 1/2/0:0
```

```
Cable Interface Queues:
```

| QID    | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |
|--------|---------|----------|-----------|-----------------|------------|-------------------|--------|
| 131147 | 0/255   | 190      | 0         | 0               | 1/240      | 0                 | 58     |
| 131148 | 0/255   | 33820    | 0         | 0               | 1/10000    | 0                 | 32824  |

```
Cable Service Flow Queues:
```

```
* Best Effort Queues
```

| QID    | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |
|--------|---------|----------|-----------|-----------------|------------|-------------------|--------|
| 131241 | 0/255   | 0        | 0         | 0               | 1/240      | 0                 | 32881  |

```
* CIR Queues
```

| QID  | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |
|------|---------|----------|-----------|-----------------|------------|-------------------|--------|
| 2049 | 254/255 | 131018   | 485751    | 99              | 1/1920     | 0                 | 32880  |

```
* Low Latency Queues
```

| QID | Len/Max | Dequeues | TailDrops |
|-----|---------|----------|-----------|
|-----|---------|----------|-----------|

### Related Commands

| Command                              | Description                                                           |
|--------------------------------------|-----------------------------------------------------------------------|
| <b>cable dynamic-bw-sharing</b>      | Enables DBS on a specific modular cable or wideband cable interface.  |
| <b>show pxf cable controller</b>     | Displays information about the RF channel VTMS links and link queues. |
| <b>show pxf cpu statistics queue</b> | Displays PXF CPU queueing counters for all interfaces.                |

# show pxf cpu queue wb-spa

To send queue and service flow information to and from the uBR10-MC 5x20 line cards, use the **show pxf cpu queue wb-spa** command in privileged EXEC mode.

**show pxf cpu queue wb-spa**

|                    |                                                                                                                                                                                                                                                                                                                                                  |                                                      |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| Syntax Description | This command has no arguments or keywords.                                                                                                                                                                                                                                                                                                       |                                                      |
| Command Default    | No default behavior or values.                                                                                                                                                                                                                                                                                                                   |                                                      |
| Command Modes      | Privileged EXEC                                                                                                                                                                                                                                                                                                                                  |                                                      |
| Command History    | Release                                                                                                                                                                                                                                                                                                                                          | Modification                                         |
|                    | 12.3(23)BC                                                                                                                                                                                                                                                                                                                                       | This command was introduced for the uBR10012 router. |
| Usage Guidelines   | A virtual time management system (VTMS) link and two queues are set up for each Wideband SPA allowing MAC Management Messages (MMM) to be sent from the uBR10-MC 5x20 line card to the Wideband SPA, which in turn sends the messages to the appropriate RF channels.                                                                            |                                                      |
|                    | In addition to this, another VTMS link and two queues are set up for each uBR10-MC 5x20 line card so that the SIP can send statistics IPC messages and cable monitor packets to the uBR10-MC 5x20 line card. The queue and service flow information for these data paths can be displayed by using the <b>show pxf cpu queue wb-spa</b> command. |                                                      |
|                    | The output of this command shows the two RP service flows for each SPA, including the RP service flow index and the associated queue ID. Refer to the <b>show pxf cpu queue qid</b> command for more information.                                                                                                                                |                                                      |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Examples | The following is a sample output of the <b>show pxf cpu queue wb-spa</b> command for the Cisco Wideband SPA port 1, slot 1, and bay 0:                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|          | <pre>Router# show pxf cpu queue wb-spa  SPA 1/0/0 MAP/UCD Service Flow Index: 32926   Ironbus Channel: 0x8000 Queue ID: 266 Queue Flags: 0x2 LP-MMM Service Flow Index: 32768   Ironbus Channel: 0x8000 Queue ID: 264 Queue Flags: 0x0  CableInternal5/1 Statistics Service Flow Index: 32887   Ironbus Channel: 0x500 Queue ID: 504 Queue Flags: 0x0 Cable Monitor Service Flow Index: 129   Ironbus Channel: 0x500 Queue ID: 505 Queue Flags: 0x0 CableInternal6/0 Statistics Service Flow Index: 32893   Ironbus Channel: 0x500 Queue ID: 516 Queue Flags: 0x0 Cable Monitor Service Flow Index: 135</pre> |  |



Ironbus Channel: 0x500 Queue ID: 517 Queue Flags: 0x0

The following is a sample output of the **show pxf cpu queue wb-spa** command for the Cisco Wideband SPA sharing downstreams with the Cisco uBR-MC3GX60V line card, in Cisco IOS Release 12.2(33)SCG:

Router# **show pxf cpu queue wb-spa**

SPA 1/1/0

MAP/UCD and LP-MMM Flow (IronBus Channel: 0xC020):

| QID    | Len/Max | Dequeues  | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |        |
|--------|---------|-----------|-----------|-----------------|------------|-------------------|--------|--------|
| 8      | 0/255   | 251121646 | 0         | 0               | 1/10000    | 0                 | 32771  | hi-pri |
| 131100 | 0/255   | 9634685   | 0         | 0               | 1/10000    | 0                 | 32770  | lo-pri |

SPA 1/3/0

MAP/UCD and LP-MMM Flow (IronBus Channel: 0xC030):

| QID    | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |        |
|--------|---------|----------|-----------|-----------------|------------|-------------------|--------|--------|
| 66     | 0/255   | 0        | 0         | 0               | 1/10000    | 0                 | 32775  | hi-pri |
| 131216 | 0/255   | 4596528  | 0         | 0               | 1/10000    | 0                 | 32774  | lo-pri |

Fauna6/0

Statistics and Cable Monitor Flow (IronBus Channel: 0x1FFF):

| QID    | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |     |
|--------|---------|----------|-----------|-----------------|------------|-------------------|--------|-----|
| 131441 | 0/255   | 0        | 0         | 0               | 1/240      | 0                 | 205    | def |

CableInternal6/0

Statistics and Cable Monitor Flow (IronBus Channel: 0x7000):

| QID    | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |        |
|--------|---------|----------|-----------|-----------------|------------|-------------------|--------|--------|
| 178    | 0/255   | 0        | 0         | 0               | 1/10000    | 0                 | 32789  | hi-pri |
| 131440 | 0/255   | 2303963  | 0         | 0               | 1/10000    | 0                 | 32788  | lo-pri |
| 131439 | 0/255   | 0        | 0         | 0               | 1/240      | 0                 | 20     | def    |

CableInternal6/1

Statistics and Cable Monitor Flow (IronBus Channel: 0x0500):

| QID    | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |        |
|--------|---------|----------|-----------|-----------------|------------|-------------------|--------|--------|
| 185    | 0/255   | 0        | 0         | 0               | 1/10000    | 0                 | 32791  | hi-pri |
| 131454 | 0/255   | 2394164  | 0         | 0               | 1/10000    | 0                 | 32790  | lo-pri |
| 131453 | 0/255   | 0        | 0         | 0               | 1/240      | 0                 | 21     | def    |

Fauna7/0

Statistics and Cable Monitor Flow (IronBus Channel: 0x1FFF):

| QID    | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |     |
|--------|---------|----------|-----------|-----------------|------------|-------------------|--------|-----|
| 131557 | 0/255   | 0        | 0         | 0               | 1/240      | 0                 | 266    | def |

CableInternal7/0

Statistics and Cable Monitor Flow (IronBus Channel: 0x7000):

| QID    | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |        |
|--------|---------|----------|-----------|-----------------|------------|-------------------|--------|--------|
| 236    | 0/255   | 4596556  | 0         | 0               | 1/10000    | 0                 | 32793  | hi-pri |
| 131556 | 0/255   | 2377280  | 0         | 0               | 1/10000    | 0                 | 32792  | lo-pri |
| 131555 | 0/255   | 0        | 0         | 0               | 1/240      | 0                 | 22     | def    |

Fauna8/0

Statistics and Cable Monitor Flow (IronBus Channel: 0x1FFF):

| QID    | Len/Max | Dequeues | TailDrops | MinRt<br>(Kbps) | Wt/Quantum | ShapeRt<br>(Kbps) | FlowId |     |
|--------|---------|----------|-----------|-----------------|------------|-------------------|--------|-----|
| 131903 | 0/255   | 0        | 0         | 0               | 1/240      | 0                 | 453    | def |

show pxf cpu queue wb-spa

```
CableInternal8/0
Statistics and Cable Monitor Flow (IronBus Channel: 0x7000):
QID Len/Max Dequeues TailDrops MinRt Wt/Quantum ShapeRt FlowId
 (Kbps) (Kbps)
409 0/255 0 0 0 1/10000 0 32797 hi-pri
131902 0/255 3350878 0 0 1/10000 0 32796 lo-pri
131901 0/255 0 0 0 1/240 0 24 def

Fauna8/1
Statistics and Cable Monitor Flow (IronBus Channel: 0x1FFF):
QID Len/Max Dequeues TailDrops MinRt Wt/Quantum ShapeRt FlowId
 (Kbps) (Kbps)
132261 0/255 0 0 0 1/240 0 697 def

CableInternal8/1
Statistics and Cable Monitor Flow (IronBus Channel: 0x7000):
QID Len/Max Dequeues TailDrops MinRt Wt/Quantum ShapeRt FlowId
 (Kbps) (Kbps)
582 0/255 0 0 0 1/10000 0 32799 hi-pri
132260 0/255 0 0 0 1/10000 0 32798 lo-pri
132259 0/255 0 0 0 1/240 0 25 def
```

Table 263 describes the fields shown in the **show pxf cpu queue WB-SPA** command display.

**Table 263** show pxf cpu queue WB-SPA Field Descriptions

| Field          | Description                                         |
|----------------|-----------------------------------------------------|
| QID            | CPU Queue ID.                                       |
| Len/Max        | Current CPU queue length/ CPU maximum queue length. |
| TailDrops      | Number of CPU queue packet drops.                   |
| ShapeRt (Kbps) | Queue packet rate shaping.                          |
| FlowId         | Service flow ID.                                    |

Related Commands

| Command                       | Description                                            |
|-------------------------------|--------------------------------------------------------|
| show pxf cpu queue <i>qid</i> | Displays parallel express forwarding queue statistics. |

# show pxf cpu statistics

To display Parallel eXpress Forwarding (PXF) CPU statistics, use the **show pxf cpu statistics** command in privileged EXEC mode.

```
show pxf cpu statistics [atom | backwalk | clear | diversion | drop [interface | vcci] | ip | ipv6 |
l2tp | mlp | qos [interface] | queue [OCQ | high Flowoff | low Flowoff] | rx [vcci] | security |
arp-filter | drl [cable-wan-ip | wan-non-ip]]
```

## Cisco 10000 Series Router

```
show pxf cpu statistics diversion [pxf [interface {interface | vcci}] | top number]
```

| Syntax                         | Description                                                                                                                                                                                          |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>atom</b>                    | (Optional) Displays Any Transport over MPLS (AToM) statistics.                                                                                                                                       |
| <b>backwalk</b>                | (Optional) Displays backwalk requests statistics.                                                                                                                                                    |
| <b>clear</b>                   | (Optional) Clears PXF CPU statistics.                                                                                                                                                                |
| <b>diversion</b>               | (Optional) Displays packets that the PXF diverted to the Route Processor (RP) for special handling.                                                                                                  |
| <b>drop</b> [interface] [vcci] | (Optional) Displays packets dropped by the PXF for a particular interface or Virtual Circuit Connection Identifier (VCCI).                                                                           |
| <b>ip</b>                      | (Optional) Displays IP statistics.                                                                                                                                                                   |
| <b>ipv6</b>                    | (Optional) Displays IPv6 statistics.                                                                                                                                                                 |
| <b>l2tp</b>                    | (Optional) Displays packet statistics for an L2TP Access Concentrator (LAC) (Optional) and L2TP Network Server (LNS).                                                                                |
| <b>mlp</b>                     | (Optional) Displays multilink PPP (MLP) statistics.                                                                                                                                                  |
| <b>pxf</b>                     | (Optional) Displays packets that the PXF diverted to the Route Processor (RP). Available on the Cisco 10000 series router only.                                                                      |
| <b>pxf interface</b> interface | (Optional) Displays per-interface PXF statistical information for the divert cause policer on a particular interface. Available on the Cisco 10000 series router only.                               |
| <b>pxf interface</b> vcci      | (Optional) Displays per-VCCI PXF statistical information for the divert cause policer on a particular Virtual Circuit Connection Identifier (VCCI). Available on the Cisco 10000 series router only. |
| <b>qos</b> [interface]         | (Optional) Displays match statistics for a service policy on an interface.                                                                                                                           |
| <b>queue</b>                   | (Optional) Displays queueing counters for all interfaces.                                                                                                                                            |
| <b>OCQ</b>                     | (Optional) Displays the OCQ statistics.                                                                                                                                                              |
| <b>high Flowoff</b>            | (Optional) Displays high priority flowoff statistics.                                                                                                                                                |
| <b>low Flowoff</b>             | (Optional) Displays low priority flowoff statistics.                                                                                                                                                 |
| <b>rx</b> [vcci]               | (Optional) Displays receive statistics for a VCCI.                                                                                                                                                   |
| <b>security</b>                | (Optional) Displays ACL matching statistics.                                                                                                                                                         |
| <b>top</b> number              | (Optional) Displays PXF statistical information for the number of top punters you specify. Available on the Cisco 10000 series router only. Valid values are from 1 to 100.                          |
| <b>arp-filter</b>              | (Optional) Displays the ARP filter statistics.                                                                                                                                                       |
| <b>drl</b>                     | (Optional) Displays the divert rate limit.                                                                                                                                                           |

|                     |                                                                    |
|---------------------|--------------------------------------------------------------------|
| <b>cable-wan-ip</b> | (Optional) Displays cable / wan-ip statistics for dropped packets. |
| <b>wan-non-ip</b>   | (Optional) Displays DRL wan-non-ip statistics for dropped packets. |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                               |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(7)XI1  | This command was integrated into Cisco IOS Release 12.3(7)XI1.                                                                                                                                                                                                                                                                                                             |
| 12.2(28)SB  | This command was introduced on the Cisco 10000 series router and integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                                                                                                                                                             |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2.                                                                                                                                                                                                                                                                                                            |
| 12.2(33)SB  | This command was enhanced to display per-interface or per-VCCI PXF statistical information for the divert cause policer on a particular interface or VCCI, to display the top punters on an interface, and to display the provisioned burst size for any divert causes. These enhancements were implemented on the Cisco 10000 series router for the PRE2, PRE3, and PRE4. |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB on the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers. Support for the Cisco uBR7225VXR router was added. The <b>arp-filter</b> , <b>drl</b> , <b>cable-wan-ip</b> , and <b>wan-non-ip</b> keywords were added .                                                                           |
| 12.2(33)SCE | This command was modified in Cisco IOS Release 12.2(33)SCE. The <b>cable-wan-ip</b> keyword was removed.                                                                                                                                                                                                                                                                   |
| 12.2(33)SCG | This command was modified in Cisco IOS Release 12.2(3)SCG. The <b>OCQ</b> , <b>high Flowoff</b> , and <b>low Flowoff</b> keywords were added.                                                                                                                                                                                                                              |

**Usage Guidelines****Cisco 10000 Series Router Usage Guidelines**

- The **show pxf cpu statistics diversion** command displays statistical information about diverted packets. Divert causes with the string "ipv6..." display as "v6..." in the output of all **show pxf cpu statistics diversion** commands
- The output from the **show pxf cpu statistics diversion pxf** command was enhanced in Cisco IOS Release 12.2(33)SB to display the provisioned burst size for any divert causes.
- The **show pxf cpu statistics diversion pxf interface *interface*** command displays statistical information about the divert cause policer on a specific interface. The output of this command is similar to the output displayed at the aggregated level. This command enables you to see the traffic types being punted from an inbound interface, subinterface, and session.
- The **show pxf cpu statistics diversion pxf interface *vcci*** command displays statistical information about the divert cause policer on a specific VCCI. The output of this command is similar to the output displayed at the aggregated level. This command enables you to see the traffic types being punted from an inbound interface, subinterface, and session.
- The **show pxf cpu statistics diversion top *number*** command displays the interfaces, subinterfaces, and sessions with the highest number of punter packets.

**Examples**

The following example shows PXF queueing counters information. These are aggregate counters for all interfaces. The Total column is the total for all columns.

**Note**

If you are troubleshooting link utilization issues, the `deq_vtp_req`, `deq_flow_off`, and `deq_ocq_off` counters may indicate what is causing the versatile time management scheduler (VTMS) to slow down.

If you are troubleshooting overall PXF throughput issues, look at the High Next Time, Low Next Time, High Wheel Slot, and Low Wheel Slot counters.

Router# **show pxf cpu statistics queue**

Column 6 Enqueue/Dequeue Counters by Rows:

| dbg Counters    | 0          | 1          | 2          | 3          | 4          | 5          | 6          | 7          |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Total           |            |            |            |            |            |            |            |            |
| =====           | =====      | =====      | =====      | =====      | =====      | =====      | =====      | =====      |
| enq_pkt         | 0x0000FD9B | 0x0000FC77 | 0x0000FE4A | 0x0000FF81 | 0x0000FC53 | 0x0000FD2E | 0x0000FF19 | 0x0000FDDE |
| 0x0007EE55      |            |            |            |            |            |            |            |            |
| tail_drop_pkt   | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| deq_pkt         | 0x0000FD47 | 0x0000FEF2 | 0x0000FCB3 | 0x0000FF65 | 0x0000FCE7 | 0x0000FC45 | 0x0000FEE7 | 0x0000FDF1 |
| 0x0007EE55      |            |            |            |            |            |            |            |            |
| deq_vtp_req     | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| deq_flow_off    | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| deq_ocq_off     | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| enqdeq_conflict | 0x0000003A | 0x00000043 | 0x0000004A | 0x00000039 | 0x0000003A | 0x0000004F | 0x00000036 | 0x00000031 |
| 0x000001F0      |            |            |            |            |            |            |            |            |
| bndl_pkt        | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| frag_pkt        | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| dbg_frag_drop   | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| dbg_bndl_sem    | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| context_inhibit | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| bfifo_enq_fail  | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| dbg1            | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| dbg2            | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| dbg3            | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| dbg4            | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| dbg5            | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x00000000      |            |            |            |            |            |            |            |            |
| dbg6            | 0x0000     | 0x0000     | 0x0000     | 0x0000     | 0x0000     | 0x0000     | 0x0000     | 0x0000     |
| 0x0000          |            |            |            |            |            |            |            |            |
| dbg7            | 0x00       | 0x00       | 0x00       | 0x00       | 0x00       | 0x00       | 0x00       | 0x00       |

Column 7 Rescheduling State Counters by Rows:

## show pxf cpu statistics

| dbg Counters    | 0          | 1          | 2          | 3          | 4          | 5          | 6          | 7          |   |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|---|
| Total           |            |            |            |            |            |            |            |            |   |
| =====           | =====      | =====      | =====      | =====      | =====      | =====      | =====      | =====      |   |
| =====           |            |            |            |            |            |            |            |            |   |
| High Next Time  | 0x524E1100 | 0x524E1140 | 0x524E1140 | 0x524E1180 | 0x524E11C0 | 0x524E11C0 | 0x524E1200 | 0x524E1240 | - |
| Low Next Time   | 0x524E1100 | 0x524E1140 | 0x524E1140 | 0x524E1180 | 0x524E11C0 | 0x524E1200 | 0x524E1200 | 0x524E1240 | - |
| High Wheel Slot | 0x00000844 | 0x00000845 | 0x00000846 | 0x00000846 | 0x00000846 | 0x00000847 | 0x00000848 | 0x00000848 | - |
| Low Wheel Slot  | 0x00000844 | 0x00000845 | 0x00000846 | 0x00000846 | 0x00000847 | 0x00000848 | 0x00000848 | 0x00000849 | - |
| DEQ_WHEEL       | 0x0001F5D0 | 0x0001F4BD | 0x0001F56B | 0x0001F6BF | 0x0001F396 | 0x0001F3E8 | 0x0001F6BF | 0x0001F4A7 |   |
| 0x000FA99B      |            |            |            |            |            |            |            |            |   |
| DQ-lock Fails   | 0x0000039F | 0x000003FD | 0x000003B2 | 0x000003E1 | 0x000003CB | 0x000003E2 | 0x000003FD | 0x000003CD |   |
| 0x00001EA6      |            |            |            |            |            |            |            |            |   |
| TW_ENQ_Fails    | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |   |
| 0x00000000      |            |            |            |            |            |            |            |            |   |
| Q_SCHED         | 0x0000FACD | 0x0000FC6B | 0x0000FA38 | 0x0000FCE4 | 0x0000FA66 | 0x0000F994 | 0x0000FC62 | 0x0000FB8B |   |
| 0x0007DA3B      |            |            |            |            |            |            |            |            |   |
| FAST_SCHED      | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |   |
| 0x00000000      |            |            |            |            |            |            |            |            |   |
| Q_DEACT         | 0x0000FB03 | 0x0000F852 | 0x0000FB33 | 0x0000F9DB | 0x0000F930 | 0x0000FA54 | 0x0000FA5D | 0x0000F91C |   |
| 0x0007CF60      |            |            |            |            |            |            |            |            |   |
| Q_ACTIVATE      | 0x0000F9B6 | 0x0000F8D4 | 0x0000FA6C | 0x0000FBA9 | 0x0000F87E | 0x0000F95B | 0x0000FB0A | 0x0000F9DE |   |
| 0x0007CF60      |            |            |            |            |            |            |            |            |   |
| Q_CHANGE        | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |   |
| 0x00000000      |            |            |            |            |            |            |            |            |   |
| DEBUG1          | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |   |
| 0x00000000      |            |            |            |            |            |            |            |            |   |
| DEBUG2          | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |   |
| 0x00000000      |            |            |            |            |            |            |            |            |   |
| DEBUG3          | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |   |
| 0x00000000      |            |            |            |            |            |            |            |            |   |
| DEBUG4          | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |   |
| 0x00000000      |            |            |            |            |            |            |            |            |   |
| DEBUG5          | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |   |
| 0x00000000      |            |            |            |            |            |            |            |            |   |

Table 264 describes the significant fields shown in the display.

**Table 264** show pxf cpu statistics queue Field Descriptions

| Field                                      | Description                                                                   |
|--------------------------------------------|-------------------------------------------------------------------------------|
| Column 6 Enqueue/Dequeue Counters by Rows: |                                                                               |
| enq_pkt                                    | Packets the PXF enqueued.                                                     |
| tail_drop_pkt                              | Packets the PXF tails dropped.                                                |
| deq_pkt                                    | Packets the PXF dequeued.                                                     |
| deq_vtp_req                                | Number of times a dequeue was inhibited due to the virtual traffic policer.   |
| deq_flow_off                               | Numbers of times a dequeue was inhibited due to a flowoff from the line card. |
| deq_ocq_off                                | Number of times a dequeue was inhibited due to link level flow control.       |
| enqdeq_conflict                            | Shows a dequeue failed due to an enqueue to the same queue in progress.       |
| bndl_pkt                                   | Count of packets that were fragmented.                                        |
| frag_pkt                                   | Count of fragments sent.                                                      |

**Table 264** *show pxf cpu statistics queue Field Descriptions (continued)*

| Field                                         | Description                                                                                          |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------|
| dbg_frag_drop                                 | Count of invalid multilink PPP (MLP) fragment handles.                                               |
| dbg_bndl_sem                                  | Count of semaphore collision (used for MLP).                                                         |
| context_inhibit                               | Number of times multilink transmit fragment processing was inhibited due to a lack of DMA resources. |
| bfifo_enq_fail                                | Count of bundle FIFO (BFIFO) enqueue failures.                                                       |
| Column 7 Rescheduling State Counters by Rows: |                                                                                                      |
| High Next Time                                | Current next send time for the high priority wheel.                                                  |
| Low Next Time                                 | Current next send time for the low priority wheel.                                                   |
| High Wheel Slot                               | Current high priority slot number.                                                                   |
| Low Wheel Slot                                | Current low priority slot number.                                                                    |
| DEQ_WHEEL                                     | Count of successful dequeues from the timing wheel.                                                  |
| DQ-lock Fails                                 | Count of timing wheel dequeue failures (both queue empty and race conditions).                       |
| TW ENG Fails                                  | Timing wheel enqueue failures.                                                                       |
| Q_SCHED                                       | Count of queues scheduled/rescheduled onto the timing wheel.                                         |
| FAST_SCHED                                    | Count of queues fast scheduled/rescheduled onto the timing wheel.                                    |
| Q_DEACT                                       | Count of queue deactivations.                                                                        |
| Q_ACTIVATE                                    | Count of queue activations (activate state).                                                         |
| Q_CHANGE                                      | Count of queue changes; for example, Route Processor (RP) inspired rates changes.                    |

The following example displays PXF L2TP packet statistics.

**Note**

For L2TP Access Concentrator (LAC) operation, all statistics are applicable. For L2TP Network Server (LNS) operation, only the PPP Control Packets, PPP Data Packets, and PPP Station Packets statistics are meaningful.

```
Router# show pxf cpu statistics l2tp

LAC Switching Global Debug Statistics:
 PPP Packets 51648
 PPP Control Packets 51647
 PPP Data Packets 1
 Not IPv4 Packets 1
 IP Short Hdr Packets 1
 IP Valid Packets 0
 IP Invalid Packets 1
 DF Cleared Packets 0
 Path MTU Packets 0
 No Path MTU Packets 0
 Within PMTU Packets 0
 Fraggable Packets 0
 PMTU Pass Packets 0
```

## ■ show pxf cpu statistics

```

PMTU Fail Packets 0
Encapped Packets 51648

```

## L2TP Classification Global Debug Statistics:

```

LAC or Multihop Packets 151341
Multihop Packets 0
PPP Control Packets 51650
PPP Data Packets 99691
PPP Station Packets 151341

```

The following example displays match statistics for the police\_test policy on an ATM interface. The Classmap Index differentiates classes within a policy while the Match Number differentiates match statements within a class.

```
Router# show pxf cpu statistics qos atm 6/0/0.81801
```

| Classmap<br>Index                     | Match<br>Number | Pkts<br>Matched | Bytes<br>Matched |
|---------------------------------------|-----------------|-----------------|------------------|
| police_test (Output) service-policy : |                 |                 |                  |
| police_class (0)                      | 0               | 0               | 0                |
|                                       | 1               | 0               | 0                |
|                                       | 2               | 0               | 0                |
|                                       | 3               | 0               | 0                |
| class-default (1)                     | 0               | 0               | 0                |

The following is a sample output of the **show pxf cpu statistics queue ocq** command for Cisco IOS Release 12.2(33)SCG:

```
Router# show pxf cpu statistics queue ocq
```

## OCQ counter per resource

| resource | flowResource | slot  | counter |
|----------|--------------|-------|---------|
| 00       | 00           |       | 0x0 (0) |
| 01       | 01           | to RP | 0x0 (0) |
| 02       | 09           | 5/0   | 0x0 (0) |
| 03       | 08           | 5/1   | 0x0 (0) |
| 04       | 07           | 6/0   | 0x0 (0) |
| 05       | 06           | 6/1   | 0x0 (0) |
| 06       | 05           | 7/0   | 0x0 (0) |
| 07       | 04           | 7/1   | 0x0 (0) |
| 08       | 03           | 8/0   | 0x0 (0) |
| 09       | 02           | 8/1   | 0x0 (0) |
| 10       | 17           | 1/0   | 0x0 (0) |
| 11       | 16           | 1/1   | 0x0 (0) |
| 12       | 15           | 2/0   | 0x0 (0) |
| 13       | 14           | 2/1   | 0x0 (0) |
| 14       | 13           | 3/0   | 0x0 (0) |
| 15       | 12           | 3/1   | 0x0 (0) |
| 16       | 11           | 4/0   | 0x0 (0) |
| 17       | 10           | 4/1   | 0x0 (0) |
| 18       | 18           |       | 0x0 (0) |
| 19       | 19           |       | 0x0 (0) |
| 20       | 20           |       | 0x0 (0) |
| 21       | 21           |       | 0x0 (0) |
| 22       | 22           |       | 0x0 (0) |
| 23       | 23           |       | 0x0 (0) |
| 24       | 24           |       | 0x0 (0) |
| 25       | 25           |       | 0x0 (0) |
| 26       | 26           |       | 0x0 (0) |
| 27       | 27           |       | 0x0 (0) |



```

28 28 0x0 (0)
29 29 0x0 (0)
30 30 0x0 (0)
31 31 0x0 (0)

```

\* slot to resource mapping may not accurate for none PRE4

### Cisco 10000 Series Router

The following example displays the top 10 packet types diverted to the RP. The output displays the top punters by interface and by Layer 2 packet flow.

Router# **show pxf cpu statistics diversion top 10**

Top 10 punters by interface are:

```

Rate (pps) Packets (diverted/dropped) vcci Interface
1 10/0 2606Virtual-Access2.1
Last diverted packet type is none.

```

Top 10 punters by Layer 2 flow are:

```

Rate (pps) Packets (diverted/dropped) Interface Layer 2 info
1 15/0 ATM2/0/3 vpi 128/vci 4096/vcci 2591
Last diverted packet type is oam_f4.
1 15/0 ATM2/0/3 vpi 128/vci 4096/vcci 2593
Last diverted packet type is oam_f4.

```

### Related Commands

| Command                              | Description                                               |
|--------------------------------------|-----------------------------------------------------------|
| <b>platform c10k divert- policer</b> | Configures the rate and burst size of the divert policer. |
| <b>show pxf statistics</b>           | Displays a summary of statistics in the PXF.              |

# show pxf cpu statistics drl ipv4

To verify drop counters for WAN-IPv4 packets, use the **show pxf cpu statistics drl ipv4** command in the privileged EXEC mode.

**show pxf cpu statistics drl ipv4** [**threshold** | *output modifiers*]

|                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>threshold</b>        | The packet threshold value. The valid range is 0 to 4294967295.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                    | <i>output modifiers</i> | <p>The following output modifiers are used.</p> <ul style="list-style-type: none"> <li><i>append</i>—Appends the redirected output to URL (URLs supporting append operation only)</li> <li><i>begin</i>—Begins with the line that matches.</li> <li><i>exclude</i>—Excludes the lines that match.</li> <li><i>include</i>—Includes the lines that match.</li> <li><i>redirect</i>—Redirects the output to the URL.</li> <li><i>section</i>—Filters a specific section of the output.</li> <li><i>tee</i>—Copies the output to the URL.</li> </ul> |

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCE    | This command was introduced. |

**Examples**

The following examples indicate the drop counters for WAN-IPv4 packets.

```

Router# show pxf cpu statistics drl ipv4
Divers-Rate-Limit WAN-IPv4 statistics
 dropped identifier
 460 11.12.13.10 VRF: global divert_code: fib_rp_dest
 150 11.12.13.10 VRF: global divert_code: fib_limited_broadcast

Router#
Router# show pxf cpu statistics drl ipv4 threshold 400
Divers-Rate-Limit WAN-IPv4 statistics :: threshold = 400
 dropped identifier
 460 11.12.13.10 VRF: global divert_code: fib_rp_dest

```

**Related Commands**

| Command                                            | Description                                                                   |
|----------------------------------------------------|-------------------------------------------------------------------------------|
| <b>clear pxf statistics drl ipv4</b>               | Clears all the entries in the WAN IPv4 statistics table.                      |
| <b>service divert-rate-limit trusted-site-ipv6</b> | Adds IPv6-specific entries to the trusted site list.                          |
| <b>show pxf cpu statistics drl us-cable</b>        | Displays the number of upstream cable packets that are dropped from the CMTS. |
| <b>show pxf cpu statistics drl ipv6</b>            | Verifies the drop counters for WAN-IPv4 packets.                              |

# show pxf cpu statistics drl ipv6

To verify drop counters for WAN-IPv6 packets, use the **show pxf cpu statistics drl ipv6** command in the privileged EXEC mode.

**show pxf cpu statistics drl ipv6** [**threshold** | *output modifiers*]

| Syntax Description | threshold        | The packet threshold value. The valid range is 0 to 4294967295.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | output modifiers | <p>The following output modifiers are used.</p> <ul style="list-style-type: none"> <li><i>append</i>—Appends the redirected output to URL (URLs supporting append operation only)</li> <li><i>begin</i>—Begins with the line that matches.</li> <li><i>exclude</i>—Excludes the lines that match.</li> <li><i>include</i>—Includes the lines that match.</li> <li><i>redirect</i>—Redirects the output to the URL.</li> <li><i>section</i>—Filters a specific section of the output.</li> <li><i>tee</i>—Copies the output to the URL.</li> </ul> |

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

**Examples**

The following examples indicate the drop counters for WAN-IPv6 packets.

```
Router# show pxf cpu statistics drl ipv6
Divers-Rate-Limit WAN-IPv6 statistics
 dropped identifier
 460 10FA:6604:8136:6502::/64 VRF: global divert_code: ipv6_rp_dest
 150 10FA:6604:8136:6502::/64 VRF: global divert_code: ipv6_rp_punt

Router#
Router# show pxf cpu statistics drl ipv6 threshold 400
Divers-Rate-Limit Cable/WAN-IP statistics :: threshold = 400
 dropped identifier
 460 10FA:6604:8136:6502::/64 VRF: global divert_code: ipv6_rp_dest

Router#
```

## Related Commands

| Command                                            | Description                                                                   |
|----------------------------------------------------|-------------------------------------------------------------------------------|
| <b>clear pxf statistics drl ipv6</b>               | Clears all the entries in the WAN IPv6 statistics table.                      |
| <b>service divert-rate-limit trusted-site-ipv6</b> | Adds IPv6-specific entries to the trusted site list.                          |
| <b>show pxf cpu statistics drl us-cable</b>        | Displays the number of upstream cable packets that are dropped from the CMTS. |
| <b>show pxf cpu statistics drl ipv4</b>            | Verifies the drop counters for WAN-IPv4 packets.                              |

# show pxf cpu statistics drl us-cable

To view and verify the number of upstream cable packets that are dropped from the CMTS, use the **show pxf cpu statistics drl us-cable** command in the privileged EXEC mode.

**show pxf cpu statistics drl us-cable** [**threshold** | *output modifiers*]

|                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>threshold</b>        | The packet threshold value. The valid range is 0 to 4294967295.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                    | <i>output modifiers</i> | <p>The following output modifiers are used.</p> <ul style="list-style-type: none"> <li><i>append</i>—Appends the redirected output to URL (URLs supporting append operation only)</li> <li><i>begin</i>—Begins with the line that matches.</li> <li><i>exclude</i>—Excludes the lines that match.</li> <li><i>include</i>—Includes the lines that match.</li> <li><i>redirect</i>—Redirects the output to the URL.</li> <li><i>section</i>—Filters a specific section of the output.</li> <li><i>tee</i>—Copies the output to the URL.</li> </ul> |

|                 |          |
|-----------------|----------|
| Command Default | Disabled |
|-----------------|----------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

**Examples**

The following examples indicate the statistics of upstream cable packets that are dropped from the CMTS.

```

Router# show pxf cpu statistics drl us-cable
Divers-Rate-Limit US-cable statistics
 dropped identifier
 361 interface: Cable6/0/1 SID: 28
 2457 interface: Cable6/0/0 SID: 1

Router# show pxf cpu statistics drl us-cable threshold 400
Divers-Rate-Limit US-cable statistics :: threshold = 400
 dropped identifier
 2457 interface: Cable6/0/0 SID: 1

Router#

```

| Related Commands | Command                                            | Description                                              |
|------------------|----------------------------------------------------|----------------------------------------------------------|
|                  | <b>clear pxf statistics drl us-cable</b>           | Clears all the entries in the US-cable statistics table. |
|                  | <b>service divert-rate-limit trusted-site-ipv6</b> | Adds IPv6-specific entries to the trusted site list.     |
|                  | <b>show pxf cpu statistics drl ipv6</b>            | Verifies the drop counters for WAN-IPv6 packets.         |
|                  | <b>show pxf cpu statistics drl ipv4</b>            | Verifies the drop counters for WAN-IPv4 packets.         |

# show pxf dma

To display information for the current state of the direct memory access (DMA) buffers, error counters, and registers on the Parallel eXpress Forwarding (PXF) processor, use the **show pxf dma** command in user EXEC or privileged EXEC mode.

**show pxf dma** [**buffers** | **counters** | **registers**]

|                    |                  |                                                                   |
|--------------------|------------------|-------------------------------------------------------------------|
| Syntax Description | <b>buffers</b>   | (Optional) Displays information about the DMA buffers.            |
|                    | <b>counters</b>  | (Optional) Displays packet and error counters for the DMA engine. |
|                    | <b>registers</b> | (Optional) Displays information about the DMA registers.          |

|                 |                                                         |
|-----------------|---------------------------------------------------------|
| Command Default | If given without any options, displays all information. |
|-----------------|---------------------------------------------------------|

|               |                            |
|---------------|----------------------------|
| Command Modes | User EXEC, Privileged EXEC |
|---------------|----------------------------|

| Command History | Release     | Modification                                                                               |
|-----------------|-------------|--------------------------------------------------------------------------------------------|
|                 | 12.2(1)XF1  | This command was introduced as <b>show hardware pxf dma</b> for the Cisco uBR10012 router. |
|                 | 12.2(15)BC2 | This command was renamed from <b>show hardware pxf dma</b> to <b>show pxf dma</b> .        |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>show pxf dma</b> command displays technical information about the current state of the DMA engine onboard the PXF processor. The <b>buffers</b> and <b>registers</b> options display information that is useful primarily to Cisco TAC engineers that are troubleshooting problems. The <b>counters</b> option displays a set of packet and error counters that can help diagnose and resolve problems with memory on the PXF processor. |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                  |
|----------|----------------------------------------------------------------------------------|
| Examples | The following example shows a typical display for the <b>dma buffers</b> option: |
|----------|----------------------------------------------------------------------------------|

Router# **show pxf dma buffers**

PXF To-RP DMA Ring Descriptors & Buffers:

|   | Descriptor Address | Buffer Address | Buffer Length (b) | Descriptor Flags |
|---|--------------------|----------------|-------------------|------------------|
| 0 | 0x0B2A6CC0         | 0x08AA80C0     | 512               | 0x0002           |
| 1 | 0x0B2A6CD0         | 0x08AA8340     | 512               | 0x0002           |
| 2 | 0x0B2A6CE0         | 0x08AA8D40     | 512               | 0x0002           |
| 3 | 0x0B2A6CF0         | 0x08AA8AC0     | 512               | 0x0002           |
| 4 | 0x0B2A6D00         | 0x08AA8FC0     | 512               | 0x0002           |
| 5 | 0x0B2A6D10         | 0x08AA9240     | 512               | 0x0002           |
| 6 | 0x0B2A6D20         | 0x08AA9740     | 512               | 0x0002           |
| 7 | 0x0B2A6D30         | 0x08AA94C0     | 512               | 0x0002           |
| 8 | 0x0B2A6D40         | 0x08AA99C0     | 512               | 0x0002           |



```

 9 0x0B2A6D50 0x08AA9C40 512 0x0002
10 0x0B2A6D60 0x08AA9EC0 512 0x0002
11 0x0B2A6D70 0x08AAA140 512 0x0002
12 0x0B2A6D80 0x08AAA640 512 0x0002
13 0x0B2A6D90 0x08AAA3C0 512 0x0002
14 0x0B2A6DA0 0x08AAA8C0 512 0x0002
15 0x0B2A6DB0 0x08AAB40 512 0x0002
16 0x0B2A6DC0 0x08AAB040 512 0x0002
17 0x0B2A6DD0 0x08AAD0 512 0x0002
18 0x0B2A6DE0 0x08AAB2C0 512 0x0002
19 0x0B2A6DF0 0x08AAB540 512 0x0002
20 0x0B2A6E00 0x08AAB7C0 512 0x0002
21 0x0B2A6E10 0x08AABA40 512 0x0002
22 0x0B2A6E20 0x08AABF40 512 0x0002
23 0x0B2A6E30 0x08AABCC0 512 0x0002
24 0x0B2A6E40 0x08AA6CC0 512 0x0002
25 0x0B2A6E50 0x08AA6F40 512 0x0002
26 0x0B2A6E60 0x08AA71C0 512 0x0002
27 0x0B2A6E70 0x08AA7440 512 0x0002
28 0x0B2A6E80 0x08AA7940 512 0x0002
29 0x0B2A6E90 0x08AA76C0 512 0x0002
30 0x0B2A6EA0 0x08AA7E40 512 0x0002
31 0x0B2A6EB0 0x08AA7BC0 512 0x0003

```

PIX From-RP DMA Ring Descriptors & Buffers:

|    | Descriptor<br>Address | Buffer<br>Address | Buffer<br>Length (b) | Descriptor<br>Flags | Context<br>Bit |
|----|-----------------------|-------------------|----------------------|---------------------|----------------|
| 0  | 0x0B2A6F00            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 1  | 0x0B2A6F10            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 2  | 0x0B2A6F20            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 3  | 0x0B2A6F30            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 4  | 0x0B2A6F40            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 5  | 0x0B2A6F50            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 6  | 0x0B2A6F60            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 7  | 0x0B2A6F70            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 8  | 0x0B2A6F80            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 9  | 0x0B2A6F90            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 10 | 0x0B2A6FA0            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 11 | 0x0B2A6FB0            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 12 | 0x0B2A6FC0            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 13 | 0x0B2A6FD0            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 14 | 0x0B2A6FE0            | 0x00000000        | 0                    | 0x0000              | Not set        |
| 15 | 0x0B2A6FF0            | 0x00000000        | 0                    | 0x0001              | Not set        |

Router#

Table 0-265 describes the fields shown in the **show pxf dma buffers** command:

**Table 0-265** Field Descriptions for the show pxf dma buffers Command

| Field              | Description                                                                                                                    |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Descriptor Address | Memory address pointing to the descriptor for this buffer.                                                                     |
| Buffer Address     | Address of this buffer in memory.                                                                                              |
| Buffer Length      | Length, in bytes, of this particular buffer.                                                                                   |
| Descriptor Flags   | Internal flags identifying this buffer's use and status.                                                                       |
| Context Bit        | State of the context bit, which is set when the buffer is currently in use by a context (the basic unit of packet processing). |

The following example shows a typical display for the **dma counters** option:

Router# **show pxf dma counters**

PXF DMA IOS Counters:

To RP Counters:

Packets: 874165, Cumulative Bytes: 531976708

Output Drops: 0, No EOP: 0, No Buffers: 0, No OWN Clear 57

From RP Counters:

Packets: 1254593, Cumulative Bytes: 275832396

Output Drops: 0, Own Errors 46

PXF DMA Driver Info:

Times Enabled: 1

GP Registers Address: 0x3C000000

Pool Address: 0x703EADB0, Buffer Pool Group: 4

ToRP Info:

Ring Address: 0x0B2A6CC0, Shadow Address: 0x7046B2D0, Ring Size: 32

Descriptor Head: 10, Starved: 0

Pak Pointer: 0x626AAD98

FromRP Info:

Ring Address: 0x0B2A6F00, Shadow Address: 0x626AB0D0, Ring Size: 16

Descriptor Head: 1, Descriptor Tail: 1, From RP count 0

High Priority Queue: 0x6226A920, Low Priority Queue: 0x6226A930

FromRP Queue Count: 0

PXF DMA Event Counters:

Event1:

PXF DMA Toaster Fault: 0

PXF DMA FTC Parity Error: 0

PXF DMA FTC Long Context Error: 0

PFX DMA FTC Short Context Error: 0

PXF DMA FTC Overflow Error: 0

PXF DMA FTC Protocol Error: 0

PXF DMA FTC Bad Address Error: 0

PXF DMA FTC Bad Address Pair Error: 0

PXF DMA FTC Invalid Command Error: 0

PXF DMA FTC Queue Full Error: 0

PXF DMA FTC Queue Threshold Exceeded Error: 0

PXF DMA Full OCQ Wait Error: 0

PXF DMA Toaster Status Wait Error: 0

PXF DMA TTQ Context Wait Error: 0

PXF DMA TBB Length Error: 0

1/0: error: 0

1/1: error: 0

2/0: error: 0

2/1: error: 0

3/0: error: 0

3/1: error: 0

4/0: error: 0

4/1: error: 0

5/0: error: 0

5/1: error: 0

6/0: error: 0

6/1: error: 0

7/0: error: 0

7/1: error: 0

8/0: error: 0

8/1: error: 0

9/0: error: 0

9/1: error: 0

PXF DMA OQC Cmd Completion Status Queue Full Error: 0

PXF DMA OQC Invalid Queue Number Error: 0

PXF DMA OQC Invalid Length Error: 0

PXF DMA PCI Parity Master Error: 0

PXF DMA PCI Parity Dev Error: 0

```

PXF DMA PCI System Error: 0
PXF DMA PCI Target Abort: 0
PXF DMA PCI Master Abort: 0
PXF DMA PCI Retry Timeout: 0
PXF DMA Single Bit SDRAM Error: 0
PXF DMA Multi-bit SDRAM Error: 0
PXF DMA Non-fatal SDRAM Error Counter Full Error: 0
PXF DMA SDRAM Request Error: 0
PXF DMA Toaster Stall Error: 0
PXF DMA New Work TTQ Full Error: 0
PXF DMA FBTTQ Full Error: 0
PXF DMA New Work TTQ FSM Error: 0
Event2:
PXF DMA Search SOP Error: 0
PXF DMA Debug Compare Match Event: 0
PXF DMA FBB Line Card Error: 0
 1/0: len 0, msop 0, crc 0, ovr 0
 1/1: len 0, msop 0, crc 0, ovr 0
 2/0: len 0, msop 0, crc 0, ovr 0
 2/1: len 0, msop 0, crc 0, ovr 0
 3/0: len 0, msop 0, crc 0, ovr 0
 3/1: len 0, msop 0, crc 0, ovr 0
 4/0: len 0, msop 0, crc 0, ovr 0
 4/1: len 0, msop 0, crc 0, ovr 0
 5/0: len 0, msop 0, crc 0, ovr 0
 5/1: len 0, msop 0, crc 0, ovr 0
 6/0: len 0, msop 0, crc 0, ovr 0
 6/1: len 0, msop 0, crc 0, ovr 0
 7/0: len 0, msop 0, crc 0, ovr 0
 7/1: len 0, msop 0, crc 0, ovr 0
 8/0: len 0, msop 0, crc 0, ovr 0
 8/1: len 0, msop 0, crc 0, ovr 0
PXF DMA FBB Flow Bit Error: 0
PXF DMA New Work Queue Low Error: 0
PXF DMA New Work Queue High Error: 0
PXF DMA NWTQT Word Valid Error: 0
PXF DMA FBTTQ Word Valid Error: 0
PXF DMA NWTQT Context Valid Error: 0
PXF DMA FBTTQ Context Valid Error: 0
PXF DMA NWTQT Context Used Error: 0
PXF DMA PMAC Write Server Error: 0
PXF DMA PMAC Read Server Error: 0
Event3:
Ironbus Event 1/0: 0
Ironbus Event 1/1: 0
Ironbus Event 2/0: 0
Ironbus Event 2/1: 0
Ironbus Event 3/0: 0
Ironbus Event 3/1: 0
Ironbus Event 4/0: 0
Ironbus Event 4/1: 0
Ironbus Event 5/0: 0
Ironbus Event 5/1: 0
Ironbus Event 6/0: 0
Ironbus Event 6/1: 0
Ironbus Event 7/0: 0
Ironbus Event 7/1: 0
Ironbus Event 8/0: 0
Ironbus Event 8/1: 0
Router#
```

The following example shows a typical display for the **dma registers** option:

Router# **show pxf dma registers**

```

PXF DMA PCI Registers:
 Vendor and Device ID: 0x00001137
 Command and Status: 0x02A00147
 Revision ID and Class Code: 0x00000000
 Cache Latency and Header BIST: 0x00003010
 Base Address Registers:
 BAR0: 0x9C000000, BAR1: 0x00000000, BAR2: 0x00000000
 BAR3: 0x00000000, BAR4: 0x00000000, BAR5: 0x00000000
 CIS Pointer Register: 0x00000000
 Subsystem Vendor ID and Subsystem ID: 0x00000000
 Expansion ROM Base Address: 0x00000000
 Interrupt Grant Latency Register: 0x00000000
PXF DMA General Purpose Registers:
 Soft Reset: 0x000000FF, Line Card Reset: 0x00000000
 PXF DMA Part Number: 0x08034101, PXF DMA Version 0x00000003
 Event1: 0x00000000, Halt Mask1: 0x6500FE00, Fault Mask1: 0x6400B400
 Event2: 0x00000008, Halt Mask2: 0x0000003F, Fault Mask2: 0x0000000C
 Event3: 0x00000000, Halt Mask3: 0x0000FFFF, Fault Mask3: 0x0000C1CF
 Debug Registers:
 Address: 0x000000CE, Out: 0x00001E11, Compare: 0x00000000
 FTBB Registers:
 Control1: 0xE0404060, Control2: 0x44444040, Control3: 0x00000040
 FBB Registers:
 Flow: 0x00000001
 Length Error: 0x00000000, Multi-SOP Error: 0x00000000
 CRC Error: 0x00000000, IPM Overrun Error: 0x00000000
 TTC Registers:
 Control: 0xFF000022, Pad1: 0xAAAAAAAA, Pad2: 0x00000000
 FTC Control: 0x00000070
 OQC Registers:
 Control: 0x000002D0, Priority: 0x00007C40, Status: 0x00000000
 SDRAM Registers:
 Control: 0x00272400, Status: 0x00000000
 ECC Override: 0x00000000, Error Address 0x00000000
 Window: 0x00000007, Timing: 0x000061A8
 To RP Registers:
 Descriptor Ring Base Address: 0x0B2A6CC0, Buffer Size: 0x00000200
 Descriptor Status: 0x00E00008, DMA Control: 0x00103E04
 Descriptor Word0: 0x08AA9740, Descriptor Word1 0x02000002
 From RP Registers:
 Descriptor Ring Base Address: 0x0B2A6F00
 Descriptor Status: 0x00D0000C, DMA Control: 0x01007E04
 Descriptor Word0: 0x00000000, Descriptor Word1: 0x00000000
 RP Debug Out: 0x00000000
Debug Registers:
 FBB Rx Iron Bus Engine Debug Resource 04: 0x00000000
 FBB Rx Iron Bus Engine Debug Resource 06: 0x00000000
 FBB Rx Iron Bus Engine Debug Resource 07: 0x00000000
 FBB Rx Iron Bus Engine Debug Resource 11: 0x00000000
 FBB Rx Iron Bus Engine Debug Resource 12: 0x00000000
 FBB Rx Iron Bus Engine Debug Resource 13: 0x00000000
 FBB Rx Iron Bus Engine Debug Resource 14: 0x00000000
 FBB Rx Iron Bus Engine Debug Resource 15: 0x00000000
 OQC Output Command Queue 03 Debug Data: 0x00001040, qN_entry_cnt[5:0]: 0
 OQC Output Command Queue 05 Debug Data: 0x00001040, qN_entry_cnt[5:0]: 0
 OQC Output Command Queue 06 Debug Data: 0x00001040, qN_entry_cnt[5:0]: 0
 OQC Output Command Queue 10 Debug Data: 0x00001040, qN_entry_cnt[5:0]: 0
 OQC Output Command Queue 11 Debug Data: 0x00001040, qN_entry_cnt[5:0]: 0
 OQC Output Command Queue 12 Debug Data: 0x00001040, qN_entry_cnt[5:0]: 0
 OQC Output Command Queue 13 Debug Data: 0x00001040, qN_entry_cnt[5:0]: 0

```

```

OQC Output Command Queue 14 Debug Data: 0x00001040, qN_entry_cnt[5:0]: 0
FTC FTQ State Debug Data: 0x0000D1A
 wr_context_num[13:7]: 26
 rd_context_num[6:0]: 26
Ironbus Registers:
Control: 0x00000001, Spy: 0x00000000
Reset: 0x0000C1CF, Ready: 0x00003E34
Slot 1, Subslot 0:
 Status: 0xFFFFFFFF, Statistics1: 0xFFFFFFFF
 Statistics2: 0xFFFFFFFF, Statistics3: 0xFFFFFFFF
Slot 1, Subslot 1:
 Status: 0xFFFFFFFF, Statistics1: 0xFFFFFFFF
 Statistics2: 0xFFFFFFFF, Statistics3: 0xFFFFFFFF
Slot 2, Subslot 0:
 Status: 0xFFFFFFFF, Statistics1: 0xFFFFFFFF
 Statistics2: 0xFFFFFFFF, Statistics3: 0xFFFFFFFF
Slot 2, Subslot 1:
 Status: 0xFFFFFFFF, Statistics1: 0xFFFFFFFF
 Statistics2: 0xFFFFFFFF, Statistics3: 0xFFFFFFFF
Slot 3, Subslot 0:
 Status: 0x00000DC0, Statistics1: 0x00000000
 Statistics2: 0x00000000, Statistics3: 0x00000000
Slot 3, Subslot 1:
 Status: 0x00000DC0, Statistics1: 0x00000000
 Statistics2: 0x00000000, Statistics3: 0x00000000
Slot 4, Subslot 0:
 Status: 0xFFFFFFFF, Statistics1: 0xFFFFFFFF
 Statistics2: 0xFFFFFFFF, Statistics3: 0xFFFFFFFF
Slot 4, Subslot 1:
 Status: 0xFFFFFFFF, Statistics1: 0xFFFFFFFF
 Statistics2: 0xFFFFFFFF, Statistics3: 0xFFFFFFFF
Slot 5, Subslot 0:
 Status: 0xFFFFFFFF, Statistics1: 0xFFFFFFFF
 Statistics2: 0xFFFFFFFF, Statistics3: 0xFFFFFFFF
Slot 5, Subslot 1:
 Status: 0x00000DC0, Statistics1: 0x00000000
 Statistics2: 0x00000000, Statistics3: 0x00000000
Slot 6, Subslot 0:
 Status: 0x00000DC0, Statistics1: 0x00000000
 Statistics2: 0x00000000, Statistics3: 0x00000000
Slot 6, Subslot 1:
 Status: 0x00000DC0, Statistics1: 0x00000000
 Statistics2: 0x00000000, Statistics3: 0x00000000
Slot 7, Subslot 0:
 Status: 0x00000DC0, Statistics1: 0x00000000
 Statistics2: 0x00000000, Statistics3: 0x00000000
Slot 7, Subslot 1:
 Status: 0x00000DC0, Statistics1: 0x00000000
 Statistics2: 0x00000000, Statistics3: 0x00000000
Slot 8, Subslot 0:
 Status: 0xFFFFFFFF, Statistics1: 0xFFFFFFFF
 Statistics2: 0xFFFFFFFF, Statistics3: 0xFFFFFFFF
Slot 8, Subslot 1:
 Status: 0xFFFFFFFF, Statistics1: 0xFFFFFFFF
 Statistics2: 0xFFFFFFFF, Statistics3: 0xFFFFFFFF
Router#

```

| Related Commands | Command                         | Description                                                                                                        |
|------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------|
|                  | <b>clear pxf</b>                | Clears the direct memory access (DMA) and error checking and correcting (ECC) error counters on the PXF processor. |
|                  | <b>debug pxf</b>                | Enables debugging of the PXF subsystems on the active PRE1 module on the Cisco uBR10012 router.                    |
|                  | <b>show pxf cable</b>           | Displays information about the multicast echo and packet intercept features for one or all cable interfaces.       |
|                  | <b>show pxf cable interface</b> | Displays information about a particular service ID (SID) on a particular cable interface.                          |
|                  | <b>show pxf cpu</b>             | Displays the display different statistics about the operation of the CPU processor during PXF processing.          |
|                  | <b>show pxf microcode</b>       | Displays identifying information for the microcode being used on the processor.                                    |
|                  | <b>show pxf xcm</b>             | Displays the current state of ECC for the External Column Memory (XCM) on the PXF processor.                       |

# show pxf microcode

To display identifying information for the microcode being used on the Parallel eXpress Forwarding (PXF) processor, use the **show pxf microcode** command in user EXEC or privileged EXEC mode.

## show pxf microcode

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no keywords or arguments. |
|---------------------------|--------------------------------------------|

|                        |                               |
|------------------------|-------------------------------|
| <b>Command Default</b> | No default behavior or values |
|------------------------|-------------------------------|

|                      |                            |
|----------------------|----------------------------|
| <b>Command Modes</b> | User EXEC, Privileged EXEC |
|----------------------|----------------------------|

| Command History | Release     | Modification                                                                                     |
|-----------------|-------------|--------------------------------------------------------------------------------------------------|
|                 | 12.2(4)XF1  | This command was introduced as <b>show hardware pxf microcode</b> for the Cisco uBR10012 router. |
|                 | 12.2(15)BC2 | This command was renamed from <b>show hardware pxf microcode</b> to <b>show pxf microcode</b> .  |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The PXF processors onboard the Performance Routing Engine (PRE1) module automatically load their microcode at the same time that the Cisco IOS image is loaded into the PRE1 module. A fault situation can cause one or both of the PXF processors to reload the microcode as needed. You can use the <b>show pxf microcode</b> command to display the version of microcode currently loaded, as well as the number of times the microcode has been loaded since the Cisco IOS software was loaded at system bootup. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows a typical display for the <b>show pxf microcode</b> command: |
|-----------------|------------------------------------------------------------------------------------------|

```
Router# show pxf microcode

PXF complex: 2 Toasters 8 Columns total
Toaster processor tmc0 is running.
Toaster processor tmc1 is running.

Loaded microcode: system:pxf/u10k-1-ucode.2.3.1
 Version: 2.3.1
 Release Software created Wed 04-Sep-02 10:04
 Signature: c99db74b91f8fae0a15e62e152c3f49f
 Microcode load attempted 1 time(s), latest 3d17h ago
 DISABLE_BOOTSTRAP_CLEAR
 tmc0 FG_PC=1 BG_PC=5 WDog=1024 MinPhase=31
 tmc1 FG_PC=1 BG_PC=5 WDog=1024 MinPhase=31
 Cobalt Registers: 9 registers specified
 00000064 0000000F 00000001
 00000090 FFFF0000 FF000000
 00000090 000003C0 00000000
 00000090 00000003 00000002
 00000094 FFFFFFFF AAAAAAAA
```

show pxf microcode

```
000000A0 000001C0 00000040
000000B0 00000200 00000200
000000B0 00000100 00000000
000000B0 0000003F 00000010
```

Router#

Table 0-266 describes the fields shown in the **show pxf microcode** command:

**Table 0-266** Field Descriptions for the show pxf microcode Command

| Field                    | Description                                                                                                                                                                                                                          |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PXF complex              | Describes the number of PXF (Toaster) processors, their associate memory columns, and their current status.                                                                                                                          |
| Loaded microcode         | Describes the source and filename for the microcode that is currently loaded on the PXF processor.                                                                                                                                   |
| Version                  | Identifies the major and minor version numbers for the current release of microcode.                                                                                                                                                 |
| Release Software created | Identifies the time and date the current microcode was compiled.                                                                                                                                                                     |
| Microcode load attempted | Identifies the number of times the PXF processor has loaded the microcode since the Cisco IOS image was loaded at system bootup. Also shows the time (in days and hours) since the last successful load of the microcode.            |
| DISABLE_BOOTSTRAP        | Displays the current state of operation for the PXF processor. During normal operation, this line shows “DISABLE_BOOTSTRAP_CLEAR”.                                                                                                   |
| tmc0, tmc1               | Identifies the current program counters and configuration for the two PXF processors.                                                                                                                                                |
| Cobalt registers         | Provides a hexadecimal dump of the current contents of the register for the Cobalt support chip, which manages the interface between the PXF processors and the backplane, and which also manages the memory for the packet buffers. |

Related Commands

| Command                         | Description                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>clear pxf</b>                | Clears the direct memory access (DMA) and error checking and correcting (ECC) error counters on the PXF processor. |
| <b>debug pxf</b>                | Enables debugging of the PXF subsystems on the active PRE1 module on the Cisco uBR10012 router.                    |
| <b>microcode</b>                | Reloads the microcode software images on one or all line cards that support downloadable microcode.                |
| <b>microcode reload</b>         | Reloads the microcode software images on one or all line cards that support downloadable microcode.                |
| <b>show pxf cable</b>           | Displays information about the multicast echo and packet intercept features for one or all cable interfaces.       |
| <b>show pxf cable interface</b> | Displays information about a particular service ID (SID) on a particular cable interface.                          |
| <b>show pxf cpu</b>             | Displays the display different statistics about the operation of the CPU processor during PXF processing.          |



| Command             | Description                                                                                       |
|---------------------|---------------------------------------------------------------------------------------------------|
| <b>show pxf dma</b> | Displays information for the current state of the PXF DMA buffers, error counters, and registers. |
| <b>show pxf xcm</b> | Displays the current state of ECC for the External Column Memory (XCM) on the PXF processor.      |

# show pxf xcm

To display the current state of error checking and correcting (ECC) for the External Column Memory (XCM) on the Parallel eXpress Forwarding (PXF) processor, use the **show pxf xcm** command in user EXEC or privileged EXEC mode.

**show pxf xcm**

**Syntax Description** This command has no keywords or arguments.

**Command Default** No default behavior or values

**Command Modes** User EXEC, Privileged EXEC

| Command History | Release     | Modification                                                                                                                                      |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(4)XF1  | This command was introduced as <b>show hardware pxf xcm</b> to support the Performance Routing Engine (PRE1) module on the Cisco uBR10012 router. |
|                 | 12.2(15)BC2 | This command was renamed from <b>show hardware pxf xcm</b> to <b>show pxf xcm</b> .                                                               |

**Usage Guidelines** The **show pxf xcm** command displays the register contents and error counters for the ECC function on the processor's XCM memory columns. Each PXF processor contains four memory columns, and ECC is enabled by default for each column.



**Note** The **show pxf xcm** command is supported only on the PRE1 and later processors for the Cisco uBR10012 router. This command is not supported on the PRE module.

**Examples** The following example shows a typical display for the **show pxf xcm** command for a PRE1 module:

```
Router# show pxf xcm

Toaster 0:
 Number of Columns: 4
 Proc ID: 0x00000002 = TMC
 ASIC Revision: 0x00000002 = T2-ECC
 XCM0 type:SDRAM, size = 67108864
 ECC is enabled for column 0
 XCM Control Register: 0x00000001
 XCM Exception Type Register: 0x00000000
 SDRAM-A Counters
 Number of ECC single bit errors: 0
 SDRAM-B Counters
 Number of ECC single bit errors: 0
 XCM1 type:SDRAM, size = 67108864
```

```
ECC is enabled for column 1
 XCM Control Register: 0x00000001
 XCM Exception Type Register: 0x00000000
 SDRAM-A Counters
 Number of ECC single bit errors: 0
 SDRAM-B Counters
 Number of ECC single bit errors: 0
XCM2 type:SDRAM, size = 67108864
ECC is enabled for column 2
 XCM Control Register: 0x00000001
 XCM Exception Type Register: 0x00000000
 SDRAM-A Counters
 Number of ECC single bit errors: 0
 SDRAM-B Counters
 Number of ECC single bit errors: 0
XCM3 type:SDRAM, size = 67108864
ECC is enabled for column 3
 XCM Control Register: 0x00000001
 XCM Exception Type Register: 0x00000000
 SDRAM-A Counters
 Number of ECC single bit errors: 0
 SDRAM-B Counters
 Number of ECC single bit errors: 0
Toaster 1:
 Number of Columns: 4
 Proc ID: 0x00000002 = TMC
 ASIC Revision: 0x00000002 = T2-ECC
 XCM0 type:SDRAM, size = 67108864
 ECC is enabled for column 0
 XCM Control Register: 0x00000001
 XCM Exception Type Register: 0x00000000
 SDRAM-A Counters
 Number of ECC single bit errors: 0
 SDRAM-B Counters
 Number of ECC single bit errors: 0
 XCM1 type:SDRAM, size = 67108864
 ECC is enabled for column 1
 XCM Control Register: 0x00000001
 XCM Exception Type Register: 0x00000000
 SDRAM-A Counters
 Number of ECC single bit errors: 0
 SDRAM-B Counters
 Number of ECC single bit errors: 0
 XCM2 type:SDRAM, size = 67108864
 ECC is enabled for column 2
 XCM Control Register: 0x00000001
 XCM Exception Type Register: 0x00000000
 SDRAM-A Counters
 Number of ECC single bit errors: 0
 SDRAM-B Counters
 Number of ECC single bit errors: 0
 XCM3 type:SDRAM, size = 67108864
 ECC is enabled for column 3
 XCM Control Register: 0x00000001
 XCM Exception Type Register: 0x00000000
 SDRAM-A Counters
 Number of ECC single bit errors: 0
 SDRAM-B Counters
 Number of ECC single bit errors: 0
Router#
```

Table 0-267 describes the fields displayed by the **show pxf xcm** command.

**Table 0-267** *show pxf xcm Field Descriptions*

| Field                                                         | Description                                                                                                    |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>The following fields appear for each PXF processor</b>     |                                                                                                                |
| Toaster 0, Toaster 1                                          | Identifies the PXF processor.                                                                                  |
| Number of Columns                                             | Identifies the number of memory columns on the PXF processor. Each PXF processor contains 4 columns of memory. |
| Proc ID:                                                      | Identifies the type of processor (TMC=Toaster Memory Column).                                                  |
| ASIC Revision                                                 | Identifies the internal version number of the PXF processor.                                                   |
| <b>The following fields appear for each XCM memory column</b> |                                                                                                                |
| XCM type                                                      | Identifies the type and size, in bytes, of memory used in this particular column.                              |
| ECC is enabled for column                                     | Identifies whether ECC checking is enabled or disabled for this memory column.                                 |
| XCM Control Register and Exception Type Register              | Identifies the contents of these two registers for the memory column.                                          |
| Number of ECC single bit errors                               | Identifies the number of single-bit errors that have been detected in the A and B banks of memory              |

The following example shows the error message that is displayed when this command is used on a PRE1 module:

```
Router# show pxf xcm

ECC is not supported for this revision

Router#
```

## Related Commands

| Command                         | Description                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>clear pxf</b>                | Clears the direct memory access (DMA) and error checking and correcting (ECC) error counters on the PXF processor. |
| <b>debug pxf</b>                | Enables debugging of the PXF subsystems on the active PRE1 module on the Cisco uBR10012 router.                    |
| <b>show pxf cable</b>           | Displays information about the multicast echo and packet intercept features for one or all cable interfaces.       |
| <b>show pxf cable interface</b> | Displays information about a particular service ID (SID) on a particular cable interface.                          |
| <b>show pxf cpu</b>             | Displays the display different statistics about the operation of the CPU processor during PXF processing.          |
| <b>show pxf microcode</b>       | Displays identifying information for the microcode being used on the processor.                                    |
| <b>show pxf dma</b>             | Displays the current state of ECC for the External Column Memory (XCM) on the PXF processor.                       |



# show redundancy (ubr10012)

To display the current redundancy status, use the **show redundancy** command in user EXEC or privileged EXEC mode.

**show redundancy** [**clients** | **counters** | **history** | **states**]

|                    |                 |                                                               |
|--------------------|-----------------|---------------------------------------------------------------|
| Syntax Description | <b>clients</b>  | (Optional) Displays the Redundancy Facility (RF) client list. |
|                    | <b>counters</b> | (Optional) Displays RF operational counters.                  |
|                    | <b>history</b>  | (Optional) Summarizes RF history.                             |
|                    | <b>states</b>   | (Optional) Displays RF states for active and standby modules. |

**Defaults** No default behavior or values

**Command Modes** User EXEC, Privileged EXEC

| Command History | Release     | Modification                                                                                                                                                                                                           |
|-----------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(4)XF1  | This command was introduced for the Cisco uBR10012 router.                                                                                                                                                             |
|                 | 12.2(11)BC3 | The <b>clients</b> , <b>counters</b> , <b>history</b> , and <b>states</b> option were added, and the default display was enhanced to show the version of Cisco IOS software that is running on the standby PRE module. |
|                 | 12.2(15)BC2 | The default display includes additional information about the history of switchovers, as well as a stack trace from the secondary PRE module's ROMMON for when it last crashed, if ever.                               |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                                                        |

**Usage Guidelines** The **show redundancy** command shows whether the PRE A slot or PRE B slot contains the active (primary) Performance Routing Engine (PRE1) module, the status of the standby (secondary) PRE1 module, and the values for the standby PRE1 module's boot variables and configuration register. In Cisco IOS Release 12.2(13)BC1 and later releases, it also shows the version of Cisco IOS software that is running on the standby PRE module.



**Note** The **show redundancy** command always shows the correct location of the active PRE1 module. The other PRE slot will always be marked as **Secondary**, even if a standby PRE1 module is not installed.

**Examples** This section contains examples of typical displays for each of the options that are available for the **show redundancy** command.

**Default Displays**

The following example shows a typical display from the show redundancy command in Cisco IOS Release 12.2(15)BC2 and later releases:

```

PRE A : Secondary
PRE B (This PRE) : Primary

Uptime since this PRE switched to active : 5 minutes
Total system uptime from reload : 37 minutes
Switchovers this system has experienced : 5
Secondary failures since this PRE active : 0
The secondary PRE has been up for : 1 minute
The reason for last switchover: ACTIVE RP CRASHED

Secondary PRE information....
Secondary is up.
Secondary has 524288K bytes of memory.
Secondary BOOT variable = slot0:ubr10k-k8p6-mz.122-11.CY,12;
Secondary CONFIG_FILE variable = bootflash:030227.config
Secondary BOOTLDR variable =
Secondary Configuration register is 0x0

Secondary version:
Cisco Internetwork Operating System Software
IOS (tm) 10000 Software (UBR10K-K8P6-M), Experimental Version 12.2(15)BC2
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled Mon 01-Mar-04 12:01 by anxrana

Primary version:
Cisco Internetwork Operating System Software
IOS (tm) 10000 Software (UBR10K-K8P6-M), Released Version 12.2(15)BC2
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled Mon 01-Mar-04 12:01 by anxrana

Redundant RP last failure info as reported by Standby:
bus error at PC 0x605C8B24, address 0xFF012345
10000 Software (UBR10K-K8P6-M), Experimental Version 12.3(20040211:230003)
[narana-geo_cable 123]
Compiled Mon 01-Mar-04 12:01 by anxrana
Image text-base: 0x60008CB8, data-base: 0x61F80000

Stack trace from system failure:
FP: 0x7234C8C8, RA: 0x605C8B24
FP: 0x7234CA30, RA: 0x604940F4
FP: 0x7234CA90, RA: 0x60151FF0
FP: 0x7234CAB0, RA: 0x604A5554
FP: 0x7234CB40, RA: 0x6051F638
FP: 0x7234CB58, RA: 0x6051F61C

```

Router#

The following example shows a typical display from the **show redundancy** command in Cisco IOS Release 12.2(15)BC1 and earlier releases. The active PRE1 module is in PRE slot A, and the standby PRE1 module is in PRE slot B:

```

Router# show redundancy

PRE A (This PRE) : Primary
PRE B : Secondary

Redundancy state is REDUNDANCY_PEERSECONDARY_INITED

Secondary PRE information....
Secondary is up.
Secondary has 524288K bytes of memory.
Secondary BOOT variable = bootflash:ubr10k-k8p6-mz

```

## ■ show redundancy (ubr10012)

```

Secondary CONFIG_FILE variable =
Secondary BOOTLDR variable = bootflash:c10k-eboot-mz
Secondary Configuration register is 0x2102

Secondary version:
Cisco Internetwork Operating System Software
IOS (tm) 10000 Software (UBR10K-K8P6-M), Released Version 12.2(11)BC3
Copyright (c) 1986-2003 by cisco Systems, Inc.
Compiled Mon 03-Mar-03 11:28 by texbnt

```

Router#

The following example shows the same display but after a switchover has occurred. The **show redundancy** command now shows that the active (primary) PRE has changed slots (in this case, moving from slot A to slot B):

Router# **show redundancy**

```

PRE A : Secondary
PRE B (This PRE) : Primary

Redundancy state is REDUNDANCY_PEERSECONDARY_INITED

Secondary PRE information...
Secondary is up.
Secondary BOOT variable = bootflash:ubr10k-k8p6-mz
Secondary CONFIG_FILE variable =
Secondary BOOTLDR variable = bootflash:c10k-eboot-mz
Secondary Configuration register is 0x2

Secondary version:
Cisco Internetwork Operating System Software
IOS (tm) 10000 Software (UBR10K-K8P6-M), Released Version 12.2(13)BC2
Copyright (c) 1986-2003 by cisco Systems, Inc.
Compiled 26 08-Feb-03 11:28 by texbnt

```

Router#

The following example shows a typical display when the standby PRE1 module is not installed or is not operational. The standby (secondary) PRE1 module is shown as not up, and its boot variables and configuration register are not shown.

Router# **show redundancy**

```

PRE A (This PRE) : Primary
PRE B : Secondary

Redundancy state is REDUNDANCY_PEERSECONDARY_NONOPERATIONAL

Secondary PRE information...
Secondary PRE is not up

```

Router#

### Clients Display

The following example shows a typical display for the **show redundancy clients** command:

Router# **show redundancy clients**

```

clientID = 0 clientSeq = 0 RF_INTERNAL_MSG
clientID = 25 clientSeq = 130 CHKPT RF
clientID = 5 clientSeq = 170 RFS client
clientID = 50 clientSeq = 530 Slot RF

```



```
clientID = 65000 clientSeq = 65000 RF_LAST_CLIENT
```

### Counters Display

The following example shows a typical display for the **show redundancy counters** command:

```
Router# show redundancy counters
```

```
Redundancy Facility OMs
 comm link up = 1
 comm link down down = 0

 invalid client tx = 0
 null tx by client = 0
 tx failures = 0
 tx msg length invalid = 0

 client not rxing msgs = 0
 rx peer msg routing errors = 0
 null peer msg rx = 0
 errored peer msg rx = 0

 buffers tx = 1009
 tx buffers unavailable = 0
 buffers rx = 1006
 buffer release errors = 0

 duplicate client registers = 0
 failed to register client = 0
 Invalid client syncs = 0
```

### History Display

The following example shows a typical display for the **show redundancy history** command:

```
Router# show redundancy history
```

```
00:00:00 client added: RF_INTERNAL_MSG(0) seq=0
00:00:00 client added: RF_LAST_CLIENT(65000) seq=65000
00:00:00 client added: CHKPT RF(25) seq=130
00:00:01 client added: Slot RF(50) seq=530
00:00:15 client added: RFS client(5) seq=170
00:00:16 *my state = INITIALIZATION(2) *peer state = DISABLED(1)
00:00:16 RF_PROG_INITIALIZATION(100) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_INITIALIZATION(100) CHKPT RF(25) op=0 rc=11
00:00:16 RF_PROG_INITIALIZATION(100) RFS client(5) op=0 rc=11
00:00:16 RF_PROG_INITIALIZATION(100) Slot RF(50) op=0 rc=11
00:00:16 RF_PROG_INITIALIZATION(100) RF_LAST_CLIENT(65000) op=0 rc=11
00:00:16 *my state = NEGOTIATION(3) peer state = DISABLED(1)
00:00:16 RF_EVENT_GO_ACTIVE(512) op=0 rc=0
00:00:16 *my state = ACTIVE-FAST(9) peer state = DISABLED(1)
00:00:16 RF_STATUS_MAINTENANCE_ENABLE(403) CHKPT RF(25) op=0 rc=0
00:00:16 RF_STATUS_MAINTENANCE_ENABLE(403) RFS client(5) op=0 rc=0
00:00:16 RF_STATUS_MAINTENANCE_ENABLE(403) Slot RF(50) op=0 rc=0
00:00:16 RF_PROG_ACTIVE_FAST(200) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_FAST(200) CHKPT RF(25) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_FAST(200) RFS client(5) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_FAST(200) Slot RF(50) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_FAST(200) RF_LAST_CLIENT(65000) op=0 rc=11
00:00:16 *my state = ACTIVE-DRAIN(10) peer state = DISABLED(1)
00:00:16 RF_PROG_ACTIVE_DRAIN(201) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_DRAIN(201) CHKPT RF(25) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_DRAIN(201) RFS client(5) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_DRAIN(201) Slot RF(50) op=0 rc=11
```

### States Display

The following example shows a typical display for the **show redundancy states** command:

```
Router# show redundancy states
 my state = 13 -ACTIVE
 peer state = 8 -STANDBY HOT
 Mode = Duplex
 Unit = Primary
 Unit ID = 0

 Redundancy Mode = Hot Standby Redundancy
 Maintenance Mode = Disabled
 Manual Swact = Enabled
 Communications = Up

 client count = 5
 client_notification_TMR = 30000 milliseconds
 RF debug mask = 0x0
```

### Related Commands

| Command                                   | Description                                                                                                  |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>associate</b>                          | Associates two line cards for Automatic Protection Switching (APS) redundancy protection.                    |
| <b>clear redundancy</b>                   | Clears the counters and history information that are used by the Redundancy Facility (RF) subsystem.         |
| <b>mode (redundancy)</b>                  | Configures the redundancy mode of operation.                                                                 |
| <b>redundancy</b>                         | Enters redundancy configuration mode.                                                                        |
| <b>redundancy force-failover main-cpu</b> | Forces a manual switchover between the active and standby PRE1 modules.                                      |
| <b>redundancy force-switchover</b>        | Forces the standby PRE to assume the role of the active PRE.                                                 |
| <b>show redundancy config-sync</b>        | Displays failure information generated during a bulk synchronization from the active PRE to the standby PRE. |
| <b>show redundancy platform</b>           | Displays active and standby PRE and software information.                                                    |

# show redundancy config-sync

To display failure information generated during a bulk synchronization from the active Performance Routing Engine (PRE) to the standby PRE, use the **show redundancy config-sync** command in user EXEC or privileged EXEC modes.

**show redundancy config-sync {failures {bem | mcl | prc} | ignored failures mcl}**

| Syntax Description | <b>failures</b>             | Displays failures related to bulk synchronisation of the standby PRE. |
|--------------------|-----------------------------|-----------------------------------------------------------------------|
|                    | <b>bem</b>                  | Displays Best Effort Method (BEM) failure list.                       |
|                    | <b>mcl</b>                  | Displays Mismatched Command List (MCL) failure list.                  |
|                    | <b>prc</b>                  | Displays Parser Return Code (PRC) failure list.                       |
|                    | <b>ignored failures mcl</b> | Displays mismatched commands in the MCL that are ignored.             |

|                 |                                |
|-----------------|--------------------------------|
| Command Default | No default behavior or values. |
|-----------------|--------------------------------|

|               |                                      |
|---------------|--------------------------------------|
| Command Modes | User EXEC (>)<br>Privileged EXEC (#) |
|---------------|--------------------------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCA | This command was introduced. |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | <p>This command is used on the active PRE only.</p> <p>If there are mismatched commands between the active and standby PRE, remove the configuration lines that are not supported on the standby image. If it is not possible to remove the mismatched lines, or it has been determined that the mismatched lines are not critical to the operation of the system, use the command <b>redundancy config-sync ignore mismatched-commands</b> to temporarily ignore them.</p> |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                  |
|----------|------------------------------------------------------------------|
| Examples | <p>The following example displays a mismatched command list:</p> |
|----------|------------------------------------------------------------------|

```
Router# show redundancy config-sync failures mcl

Mismatched Command List

- tacacs-server host 209.165.200.225 timeout 5
```

The following example shows that no mismatched commands are ignored:

```
router# show redundancy config-sync ignored failures mcl

Ignored Mismatched Command List

The list is Empty
```

The following example displays a Parser Return Code failure list:

```
router# show redundancy config-sync failures prc

PRC Failed Command List

router bgp 999
address-family ipv4 vrf TEST2
- bgp dampening 44 66 66 44
! </submode> "address-family"
address-family ipv4 vrf TEST1
- bgp dampening 44 66 66 44
! </submode> "address-family"
```

The following example displays a Best Effort Method failure list:

```
router# show redundancy config-sync failures bem

BEM Failed Command List

interface Tunnel0
- tunnel mpls traffic-eng priority 7 7
! </submode> "interface"
- next-address loose 10.165.202.158
- next-address loose 10.165.202.129
```

| Related Commands | Command                     | Description                                                  |
|------------------|-----------------------------|--------------------------------------------------------------|
|                  | redundancy force-switchover | Forces the standby PRE to assume the role of the active PRE. |
|                  | show redundancy             | Displays current active and standby PRE redundancy status.   |
|                  | show redundancy platform    | Displays active and standby PRE and software information.    |

# show redundancy platform

To display active and standby Performance Routing Engine (PRE) and software information, use the **show redundancy platform** command in user EXEC or privileged EXEC modes.

## show redundancy platform

**Syntax Description** This command has no keywords or arguments.

**Command Default** No default behavior or values.

**Command Modes** User EXEC (>  
Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCA | This command was introduced. |

**Examples** The following example displays active and standby PRE information such as PRE states, reason for last failover, total system uptime, Cisco IOS release version, and so on:

```
Router# show redundancy platform

PRE A (This PRE) : Active
PRE B : Standby
 Operating mode : SSO
Uptime since this PRE became active from reload : 13 minutes
 Standby failures since this PRE active : 0
 The standby PRE has been up for : 3 minutes
Previous rp_cre_redun_reg bits - 1057h
Current rp_cre_redun_reg bits - 1041h
Previous peer_ready_reg - 01
Current peer_ready_reg - 11
Standby PRE information....
Standby is up
Standby has 1044480K bytes of memory
Standby BOOT variable = disk1:ubr10k2-k9p6u2-mz.Prednld-prototype-2,12;
Standby CONFIG_FILE variable =
Standby BOOTLDR variable =
Standby Configuration register is 0x0
Standby version:
Cisco IOS Software, 10000 Software (UBR10K2-K9P6U2-M), Version 12.2(122_33_SCA.2008-02-15)
UBUILDIT Image, CISCO DEVELOPMENT TEST VERSION
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Sat 16-Feb-08 03:12 by jdkerr
Active version:
Cisco IOS Software, 10000 Software (UBR10K2-K9P6U2-M), Version 12.2(122_33_SCA.2008-02-15)
UBUILDIT Image, CISCO DEVELOPMENT TEST VERSION
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Sat 16-Feb-08 03:12 by jdkerr
```

| Related Commands | Command                            | Description                                                                                                  |
|------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                  | <b>debug ehosa</b>                 | Enables debug information on the EHSA module.                                                                |
|                  | <b>redundancy force-switchover</b> | Forces the standby PRE to assume the role of the active PRE.                                                 |
|                  | <b>show redundancy (ubr10012)</b>  | Displays the current redundancy status.                                                                      |
|                  | <b>show redundancy config-sync</b> | Displays failure information generated during a bulk synchronization from the active PRE to the standby PRE. |

# show running-config interface cable

To display the bundles that are configured on a Cisco CMTS router and display the running configuration for each of the cable interfaces, use the **show running-config interface cable** command in privileged EXEC mode.

```
show running-config interface cable {slot/port | slot/subslot/port }
```

**Cisco IOS Release 12.2(33)SCE and later**

```
show running-config interface cable {slot/cable-interface-index |
slot/subslot/cable-interface-index }
```

| Syntax Description           |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot</i>                  | Slot where the line card resides. <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router—The valid value is 1 or 2.</li><li>• Cisco uBR7246VXR router—The valid range is from 3 to 6.</li><li>• Cisco uBR10012 router—The valid range is from 5 to 8.</li></ul>                                                                                                                                                                     |
| <i>subslot</i>               | (Cisco uBR10012 only) Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.                                                                                                                                                                                                                                                                                                                                 |
| <i>port</i>                  | Downstream port number. <ul style="list-style-type: none"><li>• Cisco uBR7225VXR router and Cisco uBR7246VXR router—The valid value is 0 or 1.</li><li>• Cisco uBR10012 router—The valid range is from 0 to 4 (depending on the cable interface).</li></ul>                                                                                                                                                                                  |
| <i>cable-interface-index</i> | Downstream port of the Cisco uBR10-MC5X20 and Cisco uBR-MC28 line cards, or MAC domain index of the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V line cards.<br><br>Cisco uBR7225VXR and Cisco uBR7246VXR routers—The valid port value is 0 or 1.<br><br>Cisco uBR10012 router—The valid range for the Cisco uBR-MC20X20V and Cisco uBR-MC5X20 line cards is from 0 to 4. The valid range for the Cisco uBR-MC3GX60V line card is from 0 to 14. |

|                        |                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------|
| <b>Command Default</b> | Displays screen output without page breaks, removes passwords and other security information. |
|------------------------|-----------------------------------------------------------------------------------------------|

|                      |                                      |
|----------------------|--------------------------------------|
| <b>Command Modes</b> | User EXEC (>)<br>Privileged EXEC (#) |
|----------------------|--------------------------------------|

| Command History | Release    | Modification                                                                                  |
|-----------------|------------|-----------------------------------------------------------------------------------------------|
|                 | 10.0       | This command was introduced.                                                                  |
|                 | 12.3(21)BC | This command was enhanced to support cable interface bundling and virtual interface bundling. |

| Release     | Modification                                                                                                                                                                                                    |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                                                                                                                 |
| 12.2(33)SCC | The command output was modified to display profile description for the specified profile.                                                                                                                       |
| 12.2(33)SCE | This command was modified. The <i>port</i> parameter was changed to <i>cable-interface-index</i> to indicate the MAC domain index for the Cisco uBR-MC20X20V and Cisco uBR-MC3GX60V cable interface line cards. |

## Examples

The following example displays typical output for the **show running-config** command for a specified cable interface:

```
Router# show running-config interface cable 8/1/0

Building configuration...

Current configuration : 1563 bytes
!
interface Cable8/1/0
 downstream Modular-Cable 1/3/0 rf-channel 0 upstream 0-4
 no cable packet-cache
 cable bundle 1
 cable downstream channel-id 203
 cable downstream annex B
 cable downstream modulation 64qam
 cable downstream interleave-depth 32
 cable downstream frequency 525000000
 cable downstream rf-shutdown
 cable upstream max-ports 4
 cable upstream 0 connector 0
 cable upstream 0 frequency 5800000
 cable upstream 0 channel-width 1600000 1600000
 cable upstream 0 docsis-mode tdma
 cable upstream 0 minislots-size 4
 cable upstream 0 range-backoff 3 6
 cable upstream 0 modulation-profile 21
 cable upstream 0 attribute-mask 20000000
 no cable upstream 0 shutdown
 cable upstream 1 connector 1
 cable upstream 1 channel-width 1600000 1600000
 cable upstream 1 docsis-mode tdma
 cable upstream 1 minislots-size 4
 cable upstream 1 range-backoff 3 6
 cable upstream 1 modulation-profile 21
 cable upstream 1 attribute-mask 20000000
 no cable upstream 1 shutdown
 cable upstream 2 connector 2
 cable upstream 2 channel-width 1600000 1600000
 cable upstream 2 docsis-mode tdma
 cable upstream 2 minislots-size 4
 cable upstream 2 range-backoff 3 6
 cable upstream 2 modulation-profile 21
 cable upstream 2 attribute-mask 20000000
 cable upstream 2 shutdown
 cable upstream 3 connector 3
```



```

cable upstream 3 channel-width 1600000 1600000
cable upstream 3 docsis-mode tdma
cable upstream 3 minislot-size 4
cable upstream 3 range-backoff 3 6
cable upstream 3 modulation-profile 21
cable upstream 3 attribute-mask 20000000
cable upstream 3 shutdown
end

```

The following example displays the virtual bundle information for the specified bundle:

```
Router# show running-config interface Bundle 1
```

Building configuration...

```

Current configuration : 158 bytes
!
interface Bundle1
 ip address 1.60.0.1 255.255.255.0
 cable arp filter request-send 3 2
 cable arp filter reply-accept 3 2
 no cable ip-multicast-echo
end

```

The following examples displays subinterface information for the specified bundle on a Cisco uBR10012 router:

```
Router# show ip interface brief | include Bundle
```

|                       |            |     |       |    |
|-----------------------|------------|-----|-------|----|
| Wideband-Cable8/0/0:0 | Bundle2    | YES | unset | up |
| In8/0/0:0             | Bundle2    | YES | unset | up |
| Bundle1               | 1.60.0.1   | YES | NVRAM | up |
| Bundle2               | 1.80.0.1   | YES | NVRAM | up |
| Bundle5               | unassigned | YES | NVRAM | up |

```
Router# show runrunning interface Bundle150.1
```

Building configuration...

```

Current configuration : 93 bytes
!
interface Bundle150.1
 ip address 30.0.0.1 255.0.0.0
 cable helper-address 1.8.35.200
end

```

The following example displays the profile description specified for a interface on a Cisco uBR10012 router:

```
Router#show running-config | include gold
```

```

cable multicast auth profile gold
 profile-description gold profile for higher bandwidth
 bootfile goldl1_bpi.cm
tftp-server disk0:gold2.cm alias gold2.cm
tftp-server disk0:goldl1_bpi.cm alias goldl1_bpi.cm
tftp-server disk0:goldl1_bpi.cm

```

 show running-config interface cable**Related Commands**

| Command                                                           | Description                                                                                                                                                                        |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable bundle</b>                                               | Configures a cable interface to belong to an interface bundle or virtual interface bundle.                                                                                         |
| <b>profile description</b>                                        | Configures profile descriptions for each profile in the selected cable multicast authorization profile.                                                                            |
| <b>show arp</b>                                                   | Displays the entries in the router's ARP table.                                                                                                                                    |
| <b>show cable bundle</b> <i>number</i><br><b>forwarding-table</b> | Displays the MAC forwarding table for the specified bundle, showing the MAC addresses of each cable modem in a bundle and the physical cable interface that it is currently using. |
| <b>show cable modem</b>                                           | Displays the cable modems that are online both before and after cable interface bundling has been configured.                                                                      |

# show tech-support

To display general information about the Cisco CMTS router when reporting a problem to Cisco technical support, use the **show tech-support** command in privileged EXEC mode.

**show tech-support** [**page**] [**password**] [**cef** | **ipmulticast** | **isis** | **rsvp**]

| Syntax Description |                                                                                                                                                                                                                                                                                                                             |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>page</b>        | (Optional) Displays one-page of information at a time. Press <b>Return</b> key to display the next line of output or use the space bar to display the next page of information. If this keyword is not used, the output can be scrolled manually (that is, does not stop for page breaks).                                  |
| <b>password</b>    | (Optional) Displays the output without passwords and other security information in the output. If this keyword is not used, passwords and other security-sensitive information in the output are replaced with the label "<removed>" (this is the default).                                                                 |
| <b>cef</b>         | (Optional) Displays information about the Cisco Express Forwarding (CEF) protocol configuration and status.                                                                                                                                                                                                                 |
| <b>ipmulticast</b> | (Optional) Displays information about the IP multicast configuration and status.                                                                                                                                                                                                                                            |
| <b>isis</b>        | (Optional) Displays information about the Connectionless Network Service (CLNS) and Intermediate System-to-Intermediate System (IS-IS) routing protocol configuration and status.<br><br><b>Note</b> IS-IS support is provided only on CMTS platforms running Cisco IOS images that have a “-p-” as part of the image name. |
| <b>rsvp</b>        | (Optional) Displays information about the IP Resource Reservation Protocol (RSVP) configuration and status.                                                                                                                                                                                                                 |

**Command Default** Displays output without page breaks, passwords, and other security information.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                                                         |
|-----------------|------------|--------------------------------------------------------------------------------------|
|                 | 11.2       | This command was introduced.                                                         |
|                 | 12.0 T     | This command was introduced for the Cisco 1700 series router.                        |
|                 | 12.0 T     | This command was introduced for the Cisco 800 series router.                         |
|                 | 12.1(3a)XL | This command was introduced for the Cisco uBR905 cable access router.                |
|                 | 12.1(3)T   | Encryption module <b>show</b> commands were added for the Cisco 1700 series routers. |
|                 | 12.2(2)XA1 | This command was introduced for the Cisco uBR925 cable access router.                |

| Release     | Modification                                                                                                                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(4)YA   | This command was enhanced for the Cisco 806, Cisco 826, Cisco 827, and Cisco 828 routers, the Cisco 1700 series routers, and the Cisco uBR905 and Cisco uBR925 cable access routers by adding the output of Cisco Easy VPN, IPSec, access list, and NAT/PAT <b>show</b> commands. |
| 12.2(15)BC2 | This command added the <b>show pxf microcode</b> command to the output display on the Cisco uBR10012 router.                                                                                                                                                                      |
| 12.3(9a)BC  | The output from this command was shortened to allows users with large numbers of online cable modems to collect information without consuming the console session for a long period of time. Several commands from the <b>show cable tech-support</b> command were added.         |
| 12.3(33)SCG | The <b>show issu state detail</b> command was added to the <b>show tech-support</b> command on the Cisco uBR10012 router.                                                                                                                                                         |

### Usage Guidelines

The **show tech-support** command displays a large amount of configuration, run-time status, and other information about the Cisco CMTS for troubleshooting problems. The output of this command can be provided to technical support representatives when reporting a problem.



#### Note

The **show tech-support** command includes most of the information shown in the **show cable tech-support** command.

The **show tech-support** command automatically displays the output of a number of different **show** commands. The exact output depends on the platform, configuration, and type of protocols being used. Typically, the output includes the output from the following commands:

- **show version**
- **show running-config**
- **show stacks**
- **show chassis**
- **show pxf microcode** (Cisco uBR10012 only)
- **show pxf cpu statistics** (Cisco uBR10012 only)
- **show pxf cpu subblocks** (Cisco uBR10012 only)
- **show pxf cpu buffer** (Cisco uBR10012 only)
- **show pxf dma** (Cisco uBR10012 only)
- **show pxf cpu cef memory** (Cisco uBR10012 only)
- **show pxf cpu queue** (Cisco uBR10012 only)
- **show pxf cpu statistics drop** (Cisco uBR10012 only)
- **show interfaces**
- **show controllers** (for all cable interfaces)
- **show cable modem**
- **show cable flap-list**
- **show cable qos profile**

- **show cable modulation-profile**
- **show cable spectrum-group**
- **show cable hop**
- **show interface cable sid** (for each cable interface)
- **show interface cable sid connectivity** (for each cable interface)
- **show interface cable downstream**
- **show interface cable upstream**
- **show interface cable mac-scheduler**
- **show interface cable modem**
- **show issu state detail**
- **show process memory**
- **show process cpu**
- **show controllers** (for all non-cable interfaces)
- **show hccp detail**
- **show region**
- **show buffers**
- **show diag**
- **show pci hardware**
- **show pci controller**

**Tip**

Depending on the platform and configuration, the output from the **show tech-support** command can easily exceed the buffers found in most communications programs. To capture this output so it can be sent to Cisco TAC, use a Telnet program that allows you to capture the output directly to a disk.

**Tip**

In Cisco IOS Release 12.1(12)EC, Release 12.2(8)BC1, and later releases, you can add a timestamp to the **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Examples**

The following is a sample output of the **show tech-support** command:

```
Router# show tech-support
```

**Related Commands**

| Command                                | Description                                                                                                             |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>show cable tech-support</b>         | Displays the output from <b>show</b> commands that display information about the cable interfaces and cable operations. |
| <b>show controllers cable</b>          | Displays information about interface controllers of a specific line card..                                              |
| <b>show interface cable downstream</b> | Displays information about the cable interface.                                                                         |
| <b>show running-config</b>             | Displays the current run-time configuration.                                                                            |

| Command                    | Description                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>show startup-config</b> | Displays the configuration that was used to initially configure the Cisco CMTS at system startup.                                       |
| <b>show version</b>        | Displays the configuration of the system hardware, the software version, names and sources of configuration files, and the boot images. |

# show voice port

To display configuration information about a specific voice port, use the **show voice port** command in privileged EXEC mode.

**Cisco uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**show voice port** *number*

| Syntax Description | <i>number</i> | Identifies the voice port. Valid entries are <b>0</b> (which corresponds to the RJ-11 connector labeled V1) and <b>1</b> (which corresponds to the RJ-11 connector labeled V2). |
|--------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|--------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | Release    | Modification                                                          |
|-----------------|------------|-----------------------------------------------------------------------|
|                 | 12.0(4)XL  | This command was introduced for the Cisco uBR924 cable access router. |
|                 | 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                 | 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.           |

**Examples** The following example shows typical output from the **show voice port** command for a cable access router:

```
Router# show voice port 0

Foreign Exchange Station 0
Type of VoicePort is FXS
Operation State is DORMANT
Administrative State is UP
No Interface Down Failure
Description is not set
Noise Regeneration is enabled
Non Linear Processing is enabled
Music On Hold Threshold is Set to -38 dBm
In Gain is Set to -2 dB
Out Attenuation is Set to 0 dB
Echo Cancellation is enabled
Echo Cancel Coverage is set to 8 ms
Connection Mode is normal
Connection Number is not set
Initial Time Out is set to 10 s
Interdigit Time Out is set to 10 s
Call-Disconnect Time Out is set to 60 s
Ringing Time Out is set to 180 s
Region Tone is set for US

Analog Info Follows:
Currently processing none
Maintenance Mode Set to None (not in mtc mode)
Number of signaling protocol errors are 0
Impedance is set to 600r Ohm
```

```

Voice card specific Info Follows:
Signal Type is loopStart
Ring Frequency is 25 Hz
Hook Status is On Hook
Ring Active Status is inactive
Ring Ground Status is inactive
Tip Ground Status is inactive
Digit Duration Timing is set to 100 ms
InterDigit Duration Timing is set to 100 ms
Router#

```

Table 268 describes the fields shown in this display.

**Table 268** *show voice port Field Descriptions*

| Field                               | Description                                                                               |
|-------------------------------------|-------------------------------------------------------------------------------------------|
| Type of VoicePort                   | Type of voice port: always FXS for the cable access router.                               |
| Operations State                    | Operation state of the port.                                                              |
| Administrative State                | Administrative state of the voice port.                                                   |
| Interface Down Failure              | Last interface down failure that was reported, if any.                                    |
| Description                         | Description of the voice port, if any.                                                    |
| Noise Regeneration                  | Whether or not background noise should be played to fill silent gaps if VAD is activated. |
| Non Linear Processing               | Whether or not nonlinear processing is enabled for this port.                             |
| Music On Hold Threshold             | Configured music-on-hold threshold value for this interface.                              |
| In Gain                             | Amount of gain inserted at the receiver side of the interface.                            |
| Out Attenuation                     | Amount of attenuation inserted at the transmit side of the interface.                     |
| Echo Cancellation                   | Whether or not echo cancellation is enabled for this port.                                |
| Echo Cancel Coverage                | Echo cancel coverage for this port.                                                       |
| Connection Mode                     | Connection mode of the interface.                                                         |
| Connection Number                   | Full E.164 telephone number used to establish a connection with the trunk or PLAR mode.   |
| Initial Time Out                    | Amount of time the system waits for an initial input digit from the caller.               |
| Interdigit Time Out                 | Amount of time the system waits for a subsequent input digit from the caller.             |
| Call-Disconnect Time Out            | Number of seconds for an idle call to be disconnected.                                    |
| Ringing Time Out                    | Ringing time out duration.                                                                |
| Region Tone                         | Configured regional tone for this interface.                                              |
| Currently Processing                | Type of call currently being processed: none, voice, or fax.                              |
| Maintenance Mode                    | Maintenance mode of the voice port.                                                       |
| Number of signaling protocol errors | Number of signalling protocol errors.                                                     |
| Impedance                           | Configured terminating impedance for the E&M interface.                                   |



**Table 268** *show voice port Field Descriptions (continued)*

| Field                            | Description                                                                                           |
|----------------------------------|-------------------------------------------------------------------------------------------------------|
| Signal Type                      | Type of signalling for a voice port: loop-start, ground-start, wink-start, immediate, and delay-dial. |
| Ring Frequency                   | Configured ring frequency for this interface.                                                         |
| Hook Status                      | Hook status of the FXO/FXS interface.                                                                 |
| Ring Active Status               | Ring active indication.                                                                               |
| Ring Ground Status               | Ring ground indication.                                                                               |
| Tip Ground Status                | Tip ground indication.                                                                                |
| Digit Duration Timing            | DTMF digit duration in milliseconds.                                                                  |
| InterDigit Duration Timing       | DTMF interdigit duration in milliseconds.                                                             |
| InterDigit Pulse Duration Timing | Pulse dialing interdigit timing in milliseconds.                                                      |
| Alias                            | User-supplied alias for this voice port, if any.                                                      |
| Coder Type                       | Voice compression mode used.                                                                          |
| Hook Flash Duration Timing       | Maximum length of hook flash signal.                                                                  |
| Ring Cadence                     | Configured ring cadence for this interface.                                                           |

**Tip**

In Cisco IOS Release 12.2(8)T and later releases, you can add a timestamp to **show** commands using the **exec prompt timestamp** command in line configuration mode.

**Related Commands**

| Command                        | Description                                                            |
|--------------------------------|------------------------------------------------------------------------|
| <b>show call active voice</b>  | Displays the contents of the active call table.                        |
| <b>show call history voice</b> | Displays the contents of the call history table.                       |
| <b>show dial-peer voice</b>    | Displays configuration information and call statistics for dial peers. |

■ show voice port



# Cable Commands: snmp through w

Revised: August 12, 2013, OL-15510-17

## New Commands

| Command                               | Cisco IOS Software Release |
|---------------------------------------|----------------------------|
| test cable voice                      | 12.3(23)BC                 |
| tos (multicast qos)                   | 12.2(33)SCA                |
| vrf (multicast qos)                   | 12.2(33)SCA                |
| weekend duration                      | 12.3(23)BC2                |
| weekend off                           | 12.3(23)BC2                |
| weekend peak-time1                    | 12.3(23)BC2                |
| tag                                   | 12.2(33)SCC                |
| threshold                             | 12.2(33)SCC                |
| tos                                   | 12.2(33)SCC                |
| upstream                              | 12.2(33)SCC                |
| upstream(config-lb-group)             | 12.2(33)SCC                |
| upgrade fpga auto-upgrade             | 12.2(33)SCG                |
| upgrade fpga file                     | 12.2(33)SCG                |
| snmp-server enable traps docsis-resil | 12.2(33)SCG2               |
| snmp-server host traps docsis-resil   | 12.2(33)SCG2               |
| tlv                                   | 12.2(33)SCH                |

## Modified Commands

| Command                            | Cisco IOS Software Release |
|------------------------------------|----------------------------|
| upstream cable connector           | 12.2(33)SCB                |
| upgrade hw-module subslot fpd file | 12.2(33)SCB                |
| weekend duration                   | 12.2(33)SCB                |
| weekend off                        | 12.2(33)SCB                |

| Command                        | Cisco IOS Software Release |
|--------------------------------|----------------------------|
| weekend peak-time1             | 12.2(33)SCB                |
| upstream cable connector       | 12.2(33)SCD                |
| weekend duration               | 12.2(33)SCD2               |
| weekend peak-time1             | 12.2(33)SCD2               |
| snmp-server enable traps cable | 12.2(33)SCG                |

# snmp manager

To create a DOCSIS configuration file that specifies the IP address for the Simple Network Management Protocol (SNMP) manager, use the **snmp manager** command in cable config-file configuration mode. To disable this function, use the **no** form of this command.

**snmp manager** *ip-address*

**no snmp manager**

## Syntax Description

|                   |                                               |
|-------------------|-----------------------------------------------|
| <i>ip-address</i> | Specifies an IP address for the SNMP manager. |
|-------------------|-----------------------------------------------|

## Defaults

No SNMP manager is defined.

## Command Modes

Cable config-file configuration (config-file)

## Command History

| Release    | Modification                                    |
|------------|-------------------------------------------------|
| 12.1(2)EC1 | This command was introduced.                    |
| 12.2(4)BC1 | Support was added to the Release 12.2 BC train. |

## Usage Guidelines

For SNMP commands that affect the operation of the CMTS, see the *Cisco IOS Configuration Fundamentals Command Reference Guide*.

## Examples

The following example shows how to specify the IP address of the SNMP manager in a DOCSIS configuration file:

```
router(config)# cable config-file snmp.cm
router(config-file)# snmp manager 10.10.1.1
router(config-file)# exit
router(config)#
```

## Related Commands

| Command                  | Description                                                             |
|--------------------------|-------------------------------------------------------------------------|
| <b>cable config-file</b> | Creates a DOCSIS configuration file and enters configuration file mode. |
| <b>access-denied</b>     | Disables access to the network.                                         |
| <b>channel-id</b>        | Specifies upstream channel ID.                                          |
| <b>cpe max</b>           | Specifies CPE information.                                              |
| <b>download</b>          | Specifies download information for the configuration file.              |
| <b>frequency</b>         | Specifies downstream frequency.                                         |
| <b>option</b>            | Provides config-file options.                                           |

| Command              | Description                                                     |
|----------------------|-----------------------------------------------------------------|
| <b>privacy</b>       | Specifies privacy options for baseline privacy images.          |
| <b>service-class</b> | Specifies service class definitions for the configuration file. |
| <b>timestamp</b>     | Enables time-stamp generation.                                  |

# snmp-server enable traps cable

To enable the sending of Simple Network Management Protocol (SNMP) traps for cable related events, use the **snmp-server enable traps cable** command in global configuration mode. To disable the sending of traps, use the **no** form of this command.

## Cisco uBR10012 Universal Broadband Router

```
snmp-server enable traps cable [admission_control] [cm-chover] [cm-onoff]
[cm-remote-query] [dmic-lock] [enfrule-violation] [hccp-failover] [hopping] [metering]
[rfswitch-polling] [sfp-link]
```

```
no snmp-server enable traps cable [admission_control] [cm-chover] [cm-onoff]
[cm-remote-query] [dmic-lock] [enfrule-violation] [hccp-failover] [hopping] [metering]
[rfswitch-polling] [sfp-link]
```

## Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers

```
snmp-server enable traps cable [admission_control] [cm-chover] [cm-onoff]
[cm-remote-query] [dmic-lock] [enfrule-violation] [hccp-failover] [hopping] [metering]
```

```
no snmp-server enable traps cable [admission_control] [cm-chover] [cm-onoff]
[cm-remote-query] [dmic-lock] [enfrule-violation] [hccp-failover] [hopping] [metering]
```

| Syntax Description       |  |                                                                                                                                                                                   |
|--------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>admission_control</b> |  | Enables traps for Service Flow Admission Control (SFAC), as defined in CISCO-CABLE-ADMISSION-CTRL-MIB.                                                                            |
| <b>cm-chover</b>         |  | Enables traps that are sent upon completion of CMTS channel override operations, as defined in CISCO-DOCS-EXT-MIB.                                                                |
| <b>cm-onoff</b>          |  | Enables traps for CM online/offline status changes, as defined in CISCO-DOCS-EXT-MIB.                                                                                             |
| <b>cm-remote-query</b>   |  | Enables traps that are sent when the remote polling of CMs has been completed, as defined in CISCO-DOCS-REMOTE-QUERY-MIB.                                                         |
| <b>dmic-lock</b>         |  | Enables traps that are sent when a cable modem fails the dynamic shared-secret security checks, as defined in CISCO-DOCS-EXT-MIB.                                                 |
| <b>enfrule-violation</b> |  | Enables traps that are sent when a user violates their quality of service (QoS) profile, as defined in the CISCO-CABLE-QOS-MONITOR-MIB.                                           |
| <b>hccp-failover</b>     |  | Enables traps for Hot Standby Connection-to-Connection Protocol (HCCP) redundancy switchover events, as defined in CISCO-CABLE-AVAILABILITY-MIB.                                  |
| <b>hopping</b>           |  | Enables traps for spectrum hopping events, as defined in CISCO-CABLE-SPECTRUM-MIB.                                                                                                |
| <b>metering</b>          |  | Enables traps that are sent to indicate success or failure in creating the metering record file or streaming it to the collection server, as defined in CISCO-CABLE-METERING-MIB. |

|                         |                                                                                                                                                                                   |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>rfswitch-polling</b> | Enables traps that are sent when the connectivity between the Cisco CMTS and the Cisco RF Switch is lost, as defined in CISCO-CABLE-AVAILABILITY-MIB.                             |
| <b>sfp-link</b>         | Enables the traps that are sent when the SFP port link status changes on the Cisco Wideband SPA, and on the Cisco uBR-MC3GX60V line card, as defined in CISCO-CABLE-WIDEBAND-MIB. |

**Command Default**

No SNMP traps for cable-related events are enabled. You can specify one type of trap or any combination of traps. When the **snmp-server enable traps cable** command is given without any options, all cable-related traps are enabled.

**Command Modes**

Global configuration (config)

**Command History**

| Release              | Modification                                                                                                                             |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(5)T             | This command, with the <b>cm-chover</b> and <b>cm-onoff</b> options, was added.                                                          |
| 12.0(7)XR2, 12.1(1)T | The <b>cm-remote-query</b> option, along with the CISCO-DOCS-REMOTE-QUERY-MIB MIB, was introduced.                                       |
| 12.1(2)EC1           | This command was supported on the 12.1 EC train.                                                                                         |
| 12.1(7)CX1           | The <b>hopping</b> and <b>cmts-event</b> options were introduced.                                                                        |
| 12.2(4)BC1           | This command was supported on the Cisco uBR10012 universal broadband router. The <b>cmts-event</b> option was also removed as redundant. |
| 12.2(8)BC1           | The <b>hccp-failover</b> option was supported on the Cisco uBR10012 router.                                                              |
| 12.2(11)BC1          | The <b>hccp-failover</b> option was supported on the Cisco uBR7200 series router.                                                        |
| 12.2(15)BC1          | The <b>enforce-rule</b> option was added to generate traps for subscribers who violate their enforce-rule QoS profile.                   |
| 12.2(15)BC21         | The <b>dmic-lock</b> and <b>usage</b> options were added.                                                                                |
| 12.3BC               | The <b>admission_control</b> , <b>metering</b> , and <b>rfswitch-polling</b> options were added.                                         |
| 12.2(33)SCG          | The <b>sfp-link</b> option was added to generate traps when the SFP port link status changed on the Cisco uBR10012 router.               |

**Usage Guidelines**

For other SNMP commands that affect the operation of the CMTS, see the [Cisco CMTS Universal Broadband Router Series MIB Specifications Guide](#).

**Examples**

The following example shows how to enable all traps for cable-related events except HCCP switchover on the CMTS:

```
Router# configure terminal
Router(config)# snmp-server enable traps cable cm-chover cm-onoff cm-remote-query hopping
Router(config)#
```



The following example shows how to enable traps for any HCCP switchovers that occur on the CMTS:

```
Router# configure terminal
Router(config)# snmp-server enable traps cable hccp-failover
Router(config)#
```

The following example shows how to enable traps for when a user violates the maximum bandwidth for the quality of service (QoS) profile specified by their enforce-rule.

```
Router# configure terminal
Router(config)# snmp-server enable traps cable enforce-rule
Router(config)#
```

The following example shows how to enable traps for to see the SFP port link status on the Cisco uBR10012 router

```
Router# configure terminal
Router(config)# snmp-server enable traps cable sfp-link
Router(config)#
```

#### Related Commands

| Command                              | Description                                                                                      |
|--------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>cable modem remote-query</b>      | Enables and configures the remote-query feature to gather CM performance statistics on the CMTS. |
| <b>debug cable remote-query</b>      | Turns on debugging to gather information from remote CMs.                                        |
| <b>show cable modem remote-query</b> | Displays the statistics accumulated by the remote-query feature.                                 |

# snmp-server enable traps docsis-cm

To enable one or more Simple Network Management Protocol (SNMP) traps for DOCSIS 1.1 events, use the **snmp-server enable traps docsis-cm** command in global configuration mode. To disable the SNMP traps, use the **no** form of this command.

**Cisco uBR905 and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter**

**snmp-server enable traps docsis-cm [bpi | bpkm | dccack | dccreq | dccrsp | dhcp | dsack | dsreq | dsrsp | dynsa | swupevc | swupfail | swupinit | swupsucc | tlv]**

**no snmp-server enable traps docsis-cm [bpi | bpkm | dccack | dccreq | dccrsp | dhcp | dsack | dsreq | dsrsp | dynsa | swupevc | swupfail | swupinit | swupsucc | tlv]**

| Syntax Description |                                                                                               |
|--------------------|-----------------------------------------------------------------------------------------------|
| <b>bpi</b>         | (Optional) Enables Baseline Privacy Interface (BPI) initialization failure traps.             |
| <b>bpkm</b>        | (Optional) Enables Baseline Privacy Key Management (BPKM) initialization failure traps.       |
| <b>dccack</b>      | (Optional) Enables dynamic channel change acknowledgement failure traps.                      |
| <b>dcclreq</b>     | (Optional) Enables dynamic channel change request failure traps.                              |
| <b>dcclrsp</b>     | (Optional) Enables dynamic channel change response failure traps.                             |
| <b>dhcp</b>        | (Optional) Enables DHCP failure traps.                                                        |
| <b>dsack</b>       | (Optional) Enables dynamic service acknowledgement failure traps.                             |
| <b>dsreq</b>       | (Optional) Enables dynamic service request failure traps.                                     |
| <b>dsrsp</b>       | (Optional) Enables dynamic service response failure traps.                                    |
| <b>dynsa</b>       | (Optional) Enables dynamic SA failure traps.                                                  |
| <b>swupevc</b>     | (Optional) Enables secure software upgrade code verification certificate (CVC) failure traps. |
| <b>swupfail</b>    | (Optional) Enables secure software upgrade failure traps.                                     |
| <b>swupinit</b>    | (Optional) Enables secure software upgrade initialization failure traps.                      |
| <b>swupsucc</b>    | (Optional) Enables secure software upgrade success traps.                                     |
| <b>tlv</b>         | (Optional) Enables unknown Type/Length/Value (TLV) traps.                                     |

**Defaults** No traps are enabled. If no options are specified, all DOCSIS-related traps are enabled.

**Command Modes** Global configuration

| Command History | Release    | Modification                                                                                                                     |
|-----------------|------------|----------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)CZ | This command was introduced on the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

**Usage Guidelines**

This command enables the sending of SNMP traps when DOCSIS-related events occur. Multiple traps can be enabled at the same time.

**Note**

The traps are described in the DOCS-CABLE-DEVICE-TRAP-MIB MIB, which is an extension of the CABLE DEVICE MIB that is defined in RFC 2669.

**Examples**

The following example shows the BPI+ and secure software download traps being enabled:

```
Router# config terminal
Router(config)# snmp-server enable traps docsis-cm bpi bpkw swupcvc swupfail swupinit
swupsucc
Router(config)#
```

**Related Commands**

| Command                    | Description                               |
|----------------------------|-------------------------------------------|
| <b>show snmp</b>           | Checks the status of SNMP communications. |
| <b>snmp-server manager</b> | Starts the SNMP manager process.          |

# snmp-server enable traps docsis-cmts

To enable the sending of Simple Network Management Protocol (SNMP) traps for DOCSIS-related events, use the **snmp-server enable traps docsis-cmts** command in global configuration mode. To disable the sending of traps, use the **no** form of this command.

**snmp-server enable traps docsis-cmts** [*docsis-events*]

**no snmp-server enable traps docsis-cmts** [*docsis-events*]

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <p><i>docsis-events</i></p> <p>Specifies one or more of the following DOCSIS event types:</p> <ul style="list-style-type: none"> <li>• <b>bpi</b>—Enables traps for BPI initialization failure events.</li> <li>• <b>bpkm</b>—Enables traps for BPKM failure events.</li> <li>• <b>dccack</b>—Enables traps for the failure of Dynamic Channel Change Acknowledgement (DCC-ACK) requests.</li> <li>• <b>dccreq</b>—Enables traps for the failure of Dynamic Channel Change Request (DCC-REQ) requests.</li> <li>• <b>dccrsp</b>—Enables traps for the failure of Dynamic Channel Change Response (DCC-RSP) requests.</li> <li>• <b>dsac</b>—Enables traps for the failure of Dynamic Service Acknowledgement (DSx-ACK) requests.</li> <li>• <b>dsreq</b>—Enables traps for the failure of Dynamic Service Request (DSx-REQ) requests.</li> <li>• <b>dsrsp</b>—Enables traps for the failure of Dynamic Service Response (DSx-RSP) requests.</li> <li>• <b>dynsa</b>—Enables traps for the failure of Dynamic Service Addition (DSA-ACK) requests.</li> <li>• <b>regack</b>—Enables traps for the failure of Registration Acknowledgement (REG-ACK) requests.</li> <li>• <b>regreq</b>—Enables traps for the failure of Registration Request (REG-REQ) requests.</li> <li>• <b>regrsp</b>—Enables traps for the failure of Registration Response (REG-RSP) requests.</li> </ul> |
| <b>Defaults</b>           | No SNMP traps for DOCSIS-related events are enabled. When the <b>snmp-server enable traps docsis-cmts</b> command is given without any options, all DOCSIS-related traps are enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Command Modes</b>      | Global configuration (config)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Command History | Release                   | Modification                                                                                 |
|-----------------|---------------------------|----------------------------------------------------------------------------------------------|
|                 | 12.1(7)CX1,<br>12.2(4)BC1 | This command, along with the <a href="#">DOCS-CABLE-DEVICE-TRAP-MIB</a> MIB, was introduced. |

| Usage Guidelines | <p>This command enables traps that are defined in the <a href="#">DOCS-CABLE-DEVICE-TRAP-MIB</a> MIB.</p> <p>For other SNMP commands that affect the operation of the CMTS, see the <i>Cisco IOS Configuration Fundamentals Command Reference Guide</i>.</p> |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Examples | <p>The following example shows how to enable traps for the failure of DOCSIS registration-related events on the CMTS:</p> <pre>router(config)# snmp-server enable traps docsis-cmts reqack reqreq regrsp router(config)#</pre> |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                               | Description                             |
|------------------|---------------------------------------|-----------------------------------------|
|                  | <b>snmp-server enable traps cable</b> | Enables traps for cable-related events. |

# snmp-server enable traps docsis-resil

To enable Simple Network Management Protocol (SNMP) traps for Wideband Resiliency specific events on the Cisco CMTS, use the **snmp-server enable traps docsis-resil** command in global configuration mode. To disable SNMP traps, use the **no** form of this command.

**snmp-server enable traps docsis-resil** [*resil-events*]

**no snmp-server enable traps docsis-resil** [*resil-events*]

| Syntax Description | <i>resil-events</i> | Specifies one or more of the following wideband resiliency specific event types:                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    |                     | <ul style="list-style-type: none"> <li>• <b>cm-pmode</b>—Enables the wideband resiliency cable modem partial service trap.</li> <li>• <b>cm-recover</b>—Enables the wideband resiliency cable modem full service trap.</li> <li>• <b>event</b>—Enables the wideband resiliency event trap.</li> <li>• <b>rf-down</b>—Enables the wideband resiliency RF channel down status trap.</li> <li>• <b>rf-up</b>—Enables the wideband resiliency RF channel up status trap.</li> </ul> |

| Defaults | No SNMP traps for wideband resiliency specific events are enabled. When the <b>snmp-server enable traps docsis-resil</b> command is given without any options, all wideband resiliency specific traps are enabled. |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Command Modes | Global configuration (config) |
|---------------|-------------------------------|
|---------------|-------------------------------|

| Command History | Release      | Modification                 |
|-----------------|--------------|------------------------------|
|                 | 12.2(33)SCG2 | This command was introduced. |

| Usage Guidelines | <p>This command enables traps that are defined in the <a href="#">CISCO-DOCS-EXT-MIB.my</a> MIB.</p> <p>For other SNMP commands that affect the operation of the Cisco CMTS, see the <i>Cisco IOS Configuration Fundamentals Command Reference Guide</i>.</p> |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Examples | <p>The following example shows how to enable traps when the RF channel logical status changes to DOWN on the Cisco CMTS:</p> <pre>router(config)# snmp-server enable traps docsis-resil rf-down router(config)#</pre> |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Associated Features** The `snmp-server enable traps docsis-resil` command is associated with the [Wideband Modem Resiliency](#) feature.

| Related Commands | Command                                      | Description                                                                                                                  |
|------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
|                  | <code>cable resiliency traps-interval</code> | Sets the interval at which traps must be sent for Wideband Resiliency related events for each cable modem on the Cisco CMTS. |
|                  | <code>show cable modem resiliency</code>     | Displays resiliency status of the cable modem in resiliency mode on the Cisco CMTS router.                                   |
|                  | <code>snmp-server enable traps cable</code>  | Enables traps for cable-related events on the Cisco CMTS.                                                                    |

# snmp-server host traps docsis-resil

To enable Wideband Resiliency trap notifications to a specific Simple Network Management Protocol (SNMP) host on the Cisco CMTS, use the **snmp-server host traps docsis-resil** command in global configuration mode. To disable Wideband Resiliency trap notifications to a specific SNMP host, use the **no** form of this command.

**snmp-server host *ipaddr* traps *string* docsis-resil**

**no snmp-server host *ipaddr* traps *string***

|                            |                                                                                                                                                                                                                           |                                                                                                                              |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b>  | <i>ipaddr</i>                                                                                                                                                                                                             | IPv4 or IPv6 address of the SNMP notification host.                                                                          |
|                            | <i>string</i>                                                                                                                                                                                                             | SNMPv1 community string, SNMPv2c community string, or SNMPv3 username.                                                       |
| <b>Command Default</b>     | Wideband Resiliency trap notifications are not sent to an SNMP host.                                                                                                                                                      |                                                                                                                              |
| <b>Command Modes</b>       | Global configuration (config)                                                                                                                                                                                             |                                                                                                                              |
| <b>Command History</b>     | <b>Release</b>                                                                                                                                                                                                            | <b>Modification</b>                                                                                                          |
|                            | 12.2(33)SCG2                                                                                                                                                                                                              | This command was introduced.                                                                                                 |
| <b>Usage Guidelines</b>    | Use this command to start or stop sending Wideband Resiliency traps to a specific SNMP host.                                                                                                                              |                                                                                                                              |
| <b>Examples</b>            | <p>The following example shows how to enable Wideband Resiliency trap notifications to an SNMP host:</p> <pre>Router# configure terminal Router(config)# snmp-server host 172.17.2.0 traps snmp-host01 docsis-resil</pre> |                                                                                                                              |
| <b>Associated Features</b> | The <b>snmp-server host traps docsis-resil</b> command is associated with the <a href="#">Wideband Modem Resiliency</a> feature.                                                                                          |                                                                                                                              |
| <b>Related Commands</b>    | <b>cable resiliency traps-interval</b>                                                                                                                                                                                    | Sets the interval at which traps must be sent for Wideband Resiliency related events for each cable modem on the Cisco CMTS. |
|                            | <b>show cable modem resiliency</b>                                                                                                                                                                                        | Displays resiliency status of the cable modem in resiliency mode on the Cisco CMTS router.                                   |
|                            | <b>snmp-server enable traps docsis-resil</b>                                                                                                                                                                              | Enables SNMP Wideband Resiliency traps for Wideband Resiliency specific events on the Cisco CMTS.                            |



# switchover pxf restart

To configure the maximum number of PXF crashes that are allowed within a specified time period, use the **switchover pxf restart** command in redundancy configuration (main-cpu) mode. To reset the router to its default values, use the **no** form of this command.

**switchover pxf restart** *number-of-crashes time-period*

**no switchover pxf restart**

## Syntax Description

|                          |                                                                                                                                                                                                                                                                    |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>number-of-crashes</i> | Maximum number of PXF crashes that are allowed within the specified time period. If the PXF processors crash this many times within the given time period, the router switches over to the redundant PRE1 module. The valid range is 1 to 25, with a default of 2. |
| <i>time-period</i>       | Time period, in hours, that PXF crashes are monitored. The valid range is 0 to 120 hours, with a default of 5.                                                                                                                                                     |

## Defaults

2 PXF crashes within 5 hours are allowed (**switchover pxf restart 2 5**)

## Command Modes

Redundancy configuration, main-cpu mode (config-r-mc)

## Command History

| Release     | Modification                                               |
|-------------|------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced for the Cisco uBR10012 router. |

## Usage Guidelines

The PXF processors that are onboard the PRE1 module automatically restart themselves if a crash occurs. Occasional crashes could be expected, but repeated crashes could indicate a hardware problem.

The **switchover pxf restart** command specifies the maximum number of times that a PXF processor can crash during a specified time period before the router switches over to the redundant PRE1 module. If the PXF processors crash this number of times, the router assumes a hardware problem and initiates a switchover to the redundant PRE1 module.



### Note

When a switchover occurs because of repeated PXF crashes, the router displays the following system message: C10KEVENTMGR-3-PXF\_FAIL\_SWITCHOVER: Multiple PXF failures, switchover to redundant PRE initiated.

## Examples

The following example shows how to configure the router so that if five PXF crashes occur within a one-hour period, the router should initiate a switchover to the redundant PRE1 module.

```
Router# config t
Router(config)# redundancy
Router(config-r)# main-cpu
Router(config-r-mc)# switchover pxf restart 5 1
Router(config-r-mc)# exit
```

```
Router(config-f)# exit
Router(config)#
```

**Related Commands**

| Command                                           | Description                                                                                                                                                       |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>main-cpu</b>                                   | Enters main-CPU redundancy configuration mode, so that you can configure the synchronization of the active and standby Performance Routing Engine (PRE1) modules. |
| <b>redundancy</b>                                 | Configures the synchronization of system files between the active and standby PRE1 modules.                                                                       |
| <b>redundancy<br/>force-failover<br/>main-cpu</b> | Forces a manual switchover between the active and standby PRE1 modules.                                                                                           |

# switchover timeout

To configure the switchover timeout period of the PRE1 module, use the **switchover timeout** command in redundancy configuration (main-cpu) mode. To reset the timeout period to its default value, use the **no** form of this command.

**switchover timeout** *timeout-period*

**no switchover timeout**

|                           |                       |                                                                                                                                       |
|---------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>timeout-period</i> | Specifies the timeout, in milliseconds. The valid range is 0 to 25000 milliseconds (25 seconds), where 0 specifies no timeout period. |
|---------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------|

|                 |                   |
|-----------------|-------------------|
| <b>Defaults</b> | The default is 0. |
|-----------------|-------------------|

|                      |                                         |
|----------------------|-----------------------------------------|
| <b>Command Modes</b> | Redundancy configuration, main-cpu mode |
|----------------------|-----------------------------------------|

|                        |                |                                                            |
|------------------------|----------------|------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                        |
|                        | 12.2(11)BC3    | This command was introduced for the Cisco uBR10012 router. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>switchover timeout</b> command specifies how long the standby PRE module should wait when it does not detect a heartbeat from the active PRE module before initiating a switchover and assuming responsibility as the active PRE module. If set to 0, the standby PRE module initiates a switchover immediately when the active PRE module misses a scheduled heartbeat. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                               |
|-----------------|-------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to set the timeout period to 60 milliseconds: |
|-----------------|-------------------------------------------------------------------------------|

```
Router# config t
Router(config)# redundancy
Router(config-r)# main-cpu
Router(config-r-mc)# switchover timeout 60
Router(config-r-mc)# exit
Router(config-f)# exit
Router(config)#
```

|                         |                 |                                                                                                                                                                   |
|-------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>  | <b>Description</b>                                                                                                                                                |
|                         | <b>main-cpu</b> | Enters main-CPU redundancy configuration mode, so that you can configure the synchronization of the active and standby Performance Routing Engine (PRE1) modules. |

| Command                                           | Description                                                                                 |
|---------------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>redundancy</b>                                 | Configures the synchronization of system files between the active and standby PRE1 modules. |
| <b>redundancy<br/>force-failover<br/>main-cpu</b> | Forces a manual switchover between the active and standby PRE1 modules.                     |

# tag

To add a tag to a restricted load balancing group (RLBG), use the **tag** command in the config-lb-group configuration mode. To remove the tag, use the **no** form of this command.

**tag** *tag-name*

**no tag** *tag-name*

## Syntax Description

|                 |                                                                                        |
|-----------------|----------------------------------------------------------------------------------------|
| <i>tag-name</i> | The name of the tag that has been created and configured for the load balancing group. |
|-----------------|----------------------------------------------------------------------------------------|

## Command Default

No default behavior or values.

## Command Modes

DOCSIS load balancing group mode (config-lb-group)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Usage Guidelines

You can use the **tag** command to add a tag to a RLBG, only if the tag is already created using the **cable tag** command for the DOCSIS load balancing group on the CMTS.

## Examples

The following example shows how to add a tag to a RLBG using the **tag** command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# restricted
Router(config-lb-group)# tag CSCO
Router(config-lb-group)#
```

## Related Commands

| Command                                     | Description                                                                                                             |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
| <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |
| <b>cable tag</b>                            | Configures a tag for a DOCSIS load balancing group on the CMTS.                                                         |

## test cable dcc (Supporting Dynamic Channel Change)

To move a specified cable modem or a group of cable modems to another channel, or to test Dynamic Channel Change (DCC) for load balancing on the Cisco CMTS, use the following command in privileged EXEC mode.

```
test cable dcc {source-interface [cable slot/subslot/cable-interface-index | integrated-cable
slot/subslot/cable-interface-index | modular-cable slot/subslot/cable-interface-index] | sid |
ip-addr | mac-addr | frequency frequency}
{destination-interface [cable slot/subslot/cable-interface-index | integrated-cable
slot/subslot/cable-interface-index | modular-cable slot/subslot/cable-interface-index]
upstream-port}
{init-tech | force | tlv}
```

### Syntax Description

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>source-interface</i>           | Source interface of the cable modem. Use any one of the following options: <ul style="list-style-type: none"> <li><b>cable</b>—Specifies the name of the source downstream interface for the DCC transaction.</li> <li><b>integrated-cable</b>—Specifies the name of the integrated-cable interface to which the cable modem belongs.</li> <li><b>modular-cable</b>—Specifies the name of the modular-cable interface to which the cable modem belongs.</li> <li><i>slot/subslot/cable-interface-index</i>—Slot, subslot, and downstream controller number assigned to the cable modem.</li> </ul>                                                      |
| <b>sid</b>                        | (Optional) Specifies the primary Service ID (sid) value of the cable modem for that interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>ip-addr</b>                    | Specifies the IP address of the cable modem to be moved for DCC test.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>mac-addr</b>                   | Specifies the MAC address of the cable modem to be moved for DCC test.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>frequency</b> <i>frequency</i> | Specifies the DCC downstream frequency parameter.<br><br><i>frequency</i> —New downstream frequency in Hz. The valid range is between 55000000 to 1050000000 Hz.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>destination-interface</i>      | Destination interface of the cable modem. Use any one of the following options: <ul style="list-style-type: none"> <li><b>cable</b>—Specifies the name of the target or destination downstream interface to which the cable modem should be moved.</li> <li><b>integrated-cable</b>—Specifies the name of the integrated-cable interface to which the cable modem should be moved.</li> <li><b>modular-cable</b>—Specifies the name of the modular-cable interface to which the cable modem should be moved.</li> <li><i>slot/subslot/cable-interface-index</i>—Slot, subslot, and downstream controller number assigned to the cable modem.</li> </ul> |
| <b>upstream-port</b>              | Specifies the upstream port of the destination interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>init-tech</i> | (Optional) DOCSIS 3.0 GLBG DCC initialization techniques. The valid range is from 1 to 4.<br><br><b>Note</b> If <i>init-tech</i> is not specified, its value is taken as 0.                                                                                                                                                                                                                                                       |
| <i>force</i>     | (Optional) Target modem or group of modems that are forced to move to the specified downstream interface or upstream channel.<br><br><b>Note</b> This option is available only when <i>init-tech</i> is set to 0 and is used to move cable modems with Internet Group Management Protocol (IGMP) or Resource-reservation protocol (RSVP) configuration.<br><br><b>Note</b> This option cannot be used with the <i>tlv</i> option. |
| <i>tlv</i>       | (Optional) Specifies the type-length-value (TLV) in a DCC request message. This is represented as HEX data.<br><br><b>Note</b> <i>force</i> option is not available if the <i>tlv</i> option is used.                                                                                                                                                                                                                             |

**Command Default**

Test functions are disabled by default.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release      | Modification                                                                                                                                                                                           |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(17a)BC  | This command was introduced on the Cisco uBR10012 router and the Cisco uBR7246VXR router, with supporting broadband processing engines (BPEs) or cable interface line cards on the respective routers. |
| 12.2(33)SCF2 | The <i>force</i> argument was introduced.                                                                                                                                                              |

**Examples**

The following examples illustrate DCC verification, using the **test cable dcc** command.

The following example shows how to move a target cable modem, specified by MAC address, IP address, or the primary SID value on the source interface to a target downstream with the specified frequency using DCC initialization technique 0:

```
Router# test cable dcc [<mac-addr>|<ip-addr>|<cable-if-src><sid>] frequency <freq-value>
Frequency-value: <55000000-858000000> New Downstream Frequency in HZ.
```

The following example shows how to move a target cable modem, specified by MAC address, IP address, or the primary SID value on the source interface to a upstream channel on a target downstream with the DCC-REQ TLV given in the specified HEX data.

```
Router# test cable dcc [<mac-addr>|<ip-addr>|<cable-if-src><sid>] TLV <Hex-data>
```

The following example shows how to move all cable modems on a source interface to a target downstream with the specified frequency using DCC initialization technique 0.

```
Router# test cable dcc <cable-if-src> frequency <frequency-value>
Frequency-value: <55000000-858000000> New Downstream Frequency in HZ.
```

## test cable dcc (Supporting Dynamic Channel Change)

The following example shows how to force a cable modem to move to a modular-cable interface 7/0/0:2 with init-tech set to 0:

```
Router# test cable dcc 0023.4ed0.db25 modular-Cable 7/0/0:0 0 0 force
Router# show cable modem 0023.4ed0.db25
```

Load for five secs: 1%/0%; one minute: 1%; five minutes: 1%

Time source is hardware calendar, \*10:00:48.167 SGT Wed Nov 16 2011

| MAC Address    | IP Address  | I/F       | MAC State | Prim RxPwr Sid (dBmv) | Timing Offset | Num CPE | I P |
|----------------|-------------|-----------|-----------|-----------------------|---------------|---------|-----|
| 0023.4ed0.db25 | 30.11.2.118 | C7/0/0/U0 | offline   | 19 0.50               | 1862          | 0       | N   |

### Usage Guidelines

This command is subject to the restrictions and prerequisites described in [Load Balancing, Dynamic Channel Change, and Dynamic Bonding Change on the Cisco CMTS Routers](#).

The Cisco CMTS does not support the *force* option for **test cable dcc tlv** command where *tlv* is a HEXDATA node.

### Related Commands

| Command                                                                                | Description                                                                                                                                     |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance group (Supporting Dynamic Channel Change)</b>                    | Sets multiple parameters for load balancing with DCC.                                                                                           |
| <b>cable load-balance group dcc-init-technique (Supporting Dynamic Channel Change)</b> | Sets the initialization technique for Dynamic Channel Change (DCC) for load balancing.                                                          |
| <b>cable load-balance group policy (Supporting Dynamic Channel Change)</b>             | Sets the type of service flow policy (PacketCable MultiMedia (PCMM) or Unsolicited Grant Service (UGS)) for use with load balancing and DCC.    |
| <b>cable load-balance group threshold (Supporting Dynamic Channel Change)</b>          | Sets the threshold levels for corresponding service flow types for the specified load balancing group, supporting Dynamic Channel Change (DCC). |
| <b>show controllers cable</b>                                                          | Displays statistics for Dynamic Channel Change (DCC) for load balancing.                                                                        |
| <b>show cable modem</b>                                                                | Displays the information about registered and unregistered cable modems.                                                                        |



# test cable voice

To manually set voice tag of a cable modem, use the test cable voice command in privileged EXEC mode.

```
test cable voice {mac-addr | ip-addr}
```

|                           |                 |                                                                                               |
|---------------------------|-----------------|-----------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>mac-addr</i> | Specifies the MAC address of an individual CM, or of any CPE devices or hosts behind that CM. |
|                           | <i>ip-addr</i>  | Specifies the IP address of an individual CM, or of any CPE devices or hosts behind that CM.  |

|                        |                           |
|------------------------|---------------------------|
| <b>Command Default</b> | No voice tags are enabled |
|------------------------|---------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                                                            |
|------------------------|----------------|------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                        |
|                        | 12.3(23)BC     | This command was introduced for the Cisco uBR10012 router. |

|                         |                                                                                                       |
|-------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>test cable voice</b> command is intended for use by Cisco Systems technical support personnel. |
|-------------------------|-------------------------------------------------------------------------------------------------------|

|                 |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enable the voice tag of a cable modem: |
|                 | Router# <b>test cable voice 209.165.200.225</b>                           |

|                         |                                |                                                     |
|-------------------------|--------------------------------|-----------------------------------------------------|
| <b>Related Commands</b> | <b>Commands</b>                | <b>Description</b>                                  |
|                         | <b>show cable modem voice</b>  | Displays the detected voice-enabled modems.         |
|                         | <b>clear cable modem voice</b> | Clears the voice tag that is set for a cable modem. |

# test packetcable gate create

To create a test PacketCable or PCMM gate, use the **test packetcable gate create** command in privileged EXEC mode. The number of requested gates is created with the subscriber address, which must be specified. The gates created with this command are used by other test commands, such as gate-info or gate-delete, to test functionality.

**test packetcable gate create** *subscriber addr* [**dqos** | **multimedia**] [ *# of gates* ]

## Syntax Description

|                        |                                                                             |
|------------------------|-----------------------------------------------------------------------------|
| <i>subscriber addr</i> | IP address of the subscriber for whom to create test packets.               |
| <b>dqos</b>            | Specifies a PacketCable Dynamic Quality of Service (DQoS) CMS.              |
| <b>multimedia</b>      | Specifies a PCMM CMS.                                                       |
| <i># of gates</i>      | Designates the number of test gates to create for the specified IP address. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                            |
|-------------|---------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was enhanced to support PCMM on the Cisco uBR10012 router and the Cisco uBR7246VXR router. |

## Usage Guidelines

This command is supported for PC or PCMM on the Cisco CMTS.

## Related Commands

| Command                                        | Description                                                                                    |
|------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>test packetcable gc client-accept</b>       | Sends a client-accept request to a Packetcable or PCMM Call Management Server (CMS).           |
| <b>test packetcable gc gate-alloc</b>          | Sends a gate allocation message to the Packetcable DQoS processor                              |
| <b>test packetcable gc gate-delete</b>         | Sends a gate-delete request to either the Packetcable Multimedia or PC DQoS message processor. |
| <b>test packetcable gc gate-info</b>           | Sends a gate information request to the Packetcable Multimedia message processor               |
| <b>test packetcable gc gate-set multimedia</b> | Send a test gate-set request to the Packetcable Multimedia message processor.                  |
| <b>test packetcable gc initiate</b>            | Adds a test Call Management Server (CMS) for either PacketCable (DQoS) or PCMM.                |

# test packetcable gc client-accept

To send a client-accept request to a Packetcable or PCMM Call Management Server (CMS), and to initiate a session with that server, use the **test packetcable gc client-accept** command in Privileged EXEC mode.

**test packetcable gc client-accept**

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                            |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was enhanced to support PCMM on the Cisco uBR10012 router and the Cisco uBR7246VXR router. |

**Usage Guidelines** This command is supported for PC or PCMM on the Cisco CMTS. The CMS-to-client session that starts as a result of using this command can be viewed with multiple **show**, **debug** and **test** commands.

**Examples** The following example illustrates a test client-accept request:

```
Router# test packetcable gc client-accept
```

| Related Commands | Command                                        | Description                                                                                    |
|------------------|------------------------------------------------|------------------------------------------------------------------------------------------------|
|                  | <b>test packetcable gc gate-alloc</b>          | Sends a gate allocation message to the Packetcable DQoS processor                              |
|                  | <b>test packetcable gc gate-delete</b>         | Sends a gate-delete request to either the Packetcable Multimedia or PC DQoS message processor. |
|                  | <b>test packetcable gc gate-info</b>           | Sends a gate information request to the Packetcable Multimedia message processor               |
|                  | <b>test packetcable gc gate-set multimedia</b> | Send a test gate-set request to the Packetcable Multimedia message processor.                  |
|                  | <b>test packetcable gc initiate</b>            | Adds a test Call Management Server (CMS) for either PacketCable (DQoS) or PCMM.                |
|                  | <b>test packetcable gate create</b>            | Creates a test PacketCable or PCMM gate.                                                       |

# test packetcable gc gate-alloc

To send a gate allocation message to the Packetcable DQoS processor, use the **test packetcable gc gate-alloc** command in privileged EXEC mode. This test message generates from the gate controller that is specified by the GC address value. The gate is allocated for the subscriber address specified in the command.

**test packetcable gc gate-alloc** *gc-addr subscriber-addr*

| Syntax Description | <i>gc-addr</i>         | IP address for the gate controller to test. |
|--------------------|------------------------|---------------------------------------------|
|                    | <i>subscriber-addr</i> | IP address for the subscriber to test.      |

| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|
|---------------|---------------------|

| Command History | Release     | Modification                                                                                            |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------|
|                 | 12.3(13a)BC | This command was enhanced to support PCMM on the Cisco uBR10012 router and the Cisco uBR7246VXR router. |

| Usage Guidelines | This command is supported for PC or PCMM on the Cisco CMTS. |
|------------------|-------------------------------------------------------------|
|------------------|-------------------------------------------------------------|

| Related Commands | Command                                        | Description                                                                                    |
|------------------|------------------------------------------------|------------------------------------------------------------------------------------------------|
|                  | <b>test packetcable gc client-accept</b>       | Sends a client-accept request to a Packetcable or PCMM Call Management Server (CMS).           |
|                  | <b>test packetcable gc gate-delete</b>         | Sends a gate-delete request to either the Packetcable Multimedia or PC DQoS message processor. |
|                  | <b>test packetcable gc gate-info</b>           | Sends a gate information request to the Packetcable Multimedia message processor               |
|                  | <b>test packetcable gc gate-set multimedia</b> | Send a test gate-set request to the Packetcable Multimedia message processor.                  |
|                  | <b>test packetcable gc initiate</b>            | Adds a test Call Management Server (CMS) for either PacketCable (DQoS) or PCMM.                |
|                  | <b>test packetcable gate create</b>            | Creates a test PacketCable or PCMM gate.                                                       |

# test packetcable gc gate-delete

To send a gate-delete request to either the Packetcable Multimedia or PC DQoS message processor, use the **test packetcable gc gate-delete** command in privileged EXEC mode. The request includes the subscriber ID and gate ID specified in the command. The message is sent to either the DQoS or PCMM processor depending on the type of server that was used when the GC address was added.

```
test packetcable gc gate-delete gc-addr subscriber-id gate-id
```

|                           |                      |                                                                     |
|---------------------------|----------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>gc addr</i>       | IP address of the gate controller.                                  |
|                           | <i>subscriber-id</i> | The subscriber identifier to be inserted into the gate-set message. |
|                           | <i>gate-id</i>       | Gate identifier for the gate that generates the test message.       |

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                                                                                                         |
|------------------------|----------------|---------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                     |
|                        | 12.3(13a)BC    | This command was enhanced to support PCMM on the Cisco uBR10012 router and the Cisco uBR7246VXR router. |

|                         |                                                             |
|-------------------------|-------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command is supported for PC or PCMM on the Cisco CMTS. |
|-------------------------|-------------------------------------------------------------|

|                         |                                                |                                                                                      |
|-------------------------|------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>                                 | <b>Description</b>                                                                   |
|                         | <b>test packetcable gc client-accept</b>       | Sends a client-accept request to a Packetcable or PCMM Call Management Server (CMS). |
|                         | <b>test packetcable gc gate-alloc</b>          | Sends a gate allocation message to the Packetcable DQoS processor                    |
|                         | <b>test packetcable gc gate-info</b>           | Sends a gate information request to the Packetcable Multimedia message processor     |
|                         | <b>test packetcable gc gate-set multimedia</b> | Send a test gate-set request to the Packetcable Multimedia message processor.        |
|                         | <b>test packetcable gc initiate</b>            | Adds a test Call Management Server (CMS) for either PacketCable (DQoS) or PCMM.      |
|                         | <b>test packetcable gate create</b>            | Creates a test PacketCable or PCMM gate.                                             |

# test packetcable gc gate-info

To send a gate information request to the Packetcable Multimedia message processor, as if originating from the gate controller address specified, use the **test packetcable gc gate-info** command in privileged EXEC mode. The gate ID must be specified when using this command.

**test packetcable gc gate-info** *gc-addr gate-id*

## Syntax Description

|                |                                                               |
|----------------|---------------------------------------------------------------|
| <i>gc addr</i> | IP address of the gate controller.                            |
| <i>gate-id</i> | Gate identifier for the gate that generates the test message. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                            |
|-------------|---------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was enhanced to support PCMM on the Cisco uBR10012 router and the Cisco uBR7246VXR router. |

## Usage Guidelines

This command is supported for PC or PCMM on the Cisco CMTS.

## Related Commands

| Command                                        | Description                                                                                    |
|------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>test packetcable gc client-accept</b>       | Sends a client-accept request to a Packetcable or PCMM Call Management Server (CMS).           |
| <b>test packetcable gc gate-alloc</b>          | Sends a gate allocation message to the Packetcable DQoS processor                              |
| <b>test packetcable gc gate-delete</b>         | Sends a gate-delete request to either the Packetcable Multimedia or PC DQoS message processor. |
| <b>test packetcable gc gate-set multimedia</b> | Send a test gate-set request to the Packetcable Multimedia message processor.                  |
| <b>test packetcable gc initiate</b>            | Adds a test Call Management Server (CMS) for either PacketCable (DQoS) or PCMM.                |
| <b>test packetcable gate create</b>            | Creates a test PacketCable or PCMM gate.                                                       |

# test packetcable gc gate-set multimedia

To send a test gate-set request to the Packetcable Multimedia message processor, as if it comes from the gate controller, use the **test packetcable gc gate-set multimedia** command in privileged EXEC mode.

The gate ID, subscriber ID, gate state and traffic profile information are included in the test gate-set message. Other traffic profile information, like traffic profile details, display static values by default.

```
test packetcable gc gate-set gc-addr multimedia subscriber-id state gate-id traffic-type
service-class-name
```

## Syntax Description

|                           |                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------|
| <i>gc addr</i>            | IP address of the gate controller.                                                      |
| <b>dqos</b>               | Specifies a PacketCable Dynamic Quality of Service (DQoS) Call Management Server (CMS). |
| <b>multimedia</b>         | Specifies a PCMM Call Management Server (CMS).                                          |
| <i>subscriber-id</i>      | The subscriber identifier to be inserted into the gate-set message.                     |
| <i>state</i>              | State for the test gate, either Committed, Authorized, or Reserved.                     |
| <i>gate-id</i>            | The gate identifier to be inserted into the gate-set message.                           |
| <i>traffic-type</i>       | Traffic profile information to be inserted into the gate-set message.                   |
| <i>service-class-name</i> | Service class information for the gate-set message.                                     |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                              |
|-------------|-----------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced to support PCMM on the Cisco uBR10012 router and the Cisco uBR7246VXR router. |

## Usage Guidelines

This command is supported for PCMM on the Cisco CMTS.

## Related Commands

| Command                                  | Description                                                                                    |
|------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>test packetcable gc client-accept</b> | Sends a client-accept request to a Packetcable or PCMM Call Management Server (CMS).           |
| <b>test packetcable gc gate-alloc</b>    | Sends a gate allocation message to the Packetcable DQoS processor                              |
| <b>test packetcable gc gate-delete</b>   | Sends a gate-delete request to either the Packetcable Multimedia or PC DQoS message processor. |
| <b>test packetcable gc gate-info</b>     | Sends a gate information request to the Packetcable Multimedia message processor               |
| <b>test packetcable gc initiate</b>      | Adds a test Call Management Server (CMS) for either PacketCable (DQoS) or PCMM.                |
| <b>test packetcable gate create</b>      | Creates a test PacketCable or PCMM gate.                                                       |

# test packetcable gc initiate

To add a test Call Management Server (CMS) for either PacketCable (DQoS) or PCMM, use the **test packetcable gc initiate** command in privileged EXEC mode.

**test packetcable gc initiate** [**dqos** | **multimedia**] *GC-IP*

|                           |                   |                                                                           |
|---------------------------|-------------------|---------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>dqos</b>       | (Optional) Specifies a PacketCable Dynamic Quality of Service (DQoS) CMS. |
|                           | <b>multimedia</b> | (Optional) Specifies a PCMM CMS.                                          |
|                           | <i>GC-IP</i>      | IP address of the gate controller.                                        |

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                                                                                                         |
|------------------------|----------------|---------------------------------------------------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                     |
|                        | 12.3(13a)BC    | This command was enhanced to support PCMM on the Cisco uBR10012 router and the Cisco uBR7246VXR router. |

|                         |                                                                                                                                                                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command is supported for PC or PCMM on the Cisco CMTS. The type of CMS added determines the type of gate that is created. This gate type is used in all future PacketCable <b>test</b> commands that use the gate controller address specified. |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                                                |                                                                                                |
|-------------------------|------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>                                 | <b>Description</b>                                                                             |
|                         | <b>test packetcable gc client-accept</b>       | Sends a client-accept request to a Packetcable or PCMM Call Management Server (CMS).           |
|                         | <b>test packetcable gc gate-alloc</b>          | Sends a gate allocation message to the Packetcable DQoS processor                              |
|                         | <b>test packetcable gc gate-delete</b>         | Sends a gate-delete request to either the Packetcable Multimedia or PC DQoS message processor. |
|                         | <b>test packetcable gc gate-info</b>           | Sends a gate information request to the Packetcable Multimedia message processor               |
|                         | <b>test packetcable gc gate-set multimedia</b> | Send a test gate-set request to the Packetcable Multimedia message processor.                  |
|                         | <b>test packetcable gate create</b>            | Creates a test PacketCable or PCMM gate.                                                       |



# threshold

To specify the load limit beyond which load balancing occurs, use the **threshold** command in the config-lb-group configuration mode. To remove the specified load limit, use the **no** form of this command.

```
threshold {load {minimum 1-100 | 1-100} | pcmm 1-100 | stability 0-100 | ugs 1-100}
```

```
no threshold {load {minimum | 1-100} | pcmm 1-100 | stability 0-100 | ugs 1-100}
```

## Syntax Description

|                       |                                                                                                                                                                                   |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>load {minimum}</b> | Specifies interface load threshold settings as a percentage value. You can also set minimum number of modems/flows difference ranging from 1 to 100 before load balancing starts. |
| <b>pcmm</b>           | Specifies PCMM service flow threshold as a percentage value.                                                                                                                      |
| <b>stability</b>      | Specifies stability condition detection threshold as a percentage value.                                                                                                          |
| <b>ugs</b>            | Specifies stability detection threshold as a percentage value.                                                                                                                    |

## Command Default

No default behavior or values.

## Command Modes

DOCSIS load balancing group mode (config-lb-group)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCC | This command was introduced. |

## Examples

The following example shows how to configure the threshold of the DOCSIS LBG using the **threshold** command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# threshold load minimum 10
Router(config-lb-group)#
```

## Related Commands

| Command                                     | Description                                                                                                             |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                   |
| <b>show cable load-balance docsis-group</b> | Displays real-time configuration, statistical, and operational information for load balancing operations on the router. |

# timestamp

To create a DOCSIS configuration file that enables timestamp generation, use the **timestamp** command in cable config-file configuration mode. To disable this function, use the **no** form of this command.

**timestamp**

**no timestamp**

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behaviors or values

**Command Modes** Cable config-file configuration (config-file)

| Command History | Release    | Modification                                    |
|-----------------|------------|-------------------------------------------------|
|                 | 12.1(2)EC1 | This command was introduced.                    |
|                 | 12.2(4)BC1 | Support was added to the Release 12.2 BC train. |
|                 |            |                                                 |

**Usage Guidelines** The DOCSIS specification supports the optional time-stamping of DOCSIS configuration files by adding a field to the file that shows the time that the file was sent to the CM. This prevents someone from trying to subvert DOCSIS security by replaying a valid DOCSIS configuration file to another CM. The timestamp is expressed as the number of seconds since midnight on January 1, 1900.

**Examples** The following example shows how to enable timestamp generation for the DOCSIS configuration file.

```
router(config)# cable config-file upgrade.cm
router(config-file)# timestamp
router(config-file)# exit
router(config)#
```

| Related Commands | Command                  | Description                                                             |
|------------------|--------------------------|-------------------------------------------------------------------------|
|                  | <b>cable config-file</b> | Creates a DOCSIS configuration file and enters configuration file mode. |
|                  | <b>access-denied</b>     | Disables access to the network.                                         |
|                  | <b>channel-id</b>        | Specifies upstream channel ID.                                          |
|                  | <b>cpe max</b>           | Specifies CPE information.                                              |
|                  | <b>download</b>          | Specifies download information for the configuration file.              |
|                  | <b>frequency</b>         | Specifies downstream frequency.                                         |
|                  | <b>option</b>            | Provides config-file options.                                           |

| Command              | Description                                                     |
|----------------------|-----------------------------------------------------------------|
| <b>privacy</b>       | Specifies privacy options for baseline privacy images.          |
| <b>service-class</b> | Specifies service class definitions for the configuration file. |
| <b>snmp manager</b>  | Specifies Simple Network Management Protocol (SNMP) options.    |

# tlv

To configure a TLV type tag matching rule, use the **tlv** command in CMTS-tag configuration mode.

**tlv** *type value*

|                           |              |                                                                                                                                                                                                                                                                                        |
|---------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>type</i>  | Specifies the type identifier. It can be one of the following: <ul style="list-style-type: none"><li>• <b>mracs</b> - Multiple Receive Channel Support.</li><li>• <b>mtcs</b> - Multiple Transmit Channel Support.</li><li>• <b>ufrs</b> - Upstream Frequency Range Support.</li></ul> |
|                           | <i>value</i> | Specifies a decimal number value for the type tag. The range is 0 to 255.                                                                                                                                                                                                              |

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                                                |
|----------------------|------------------------------------------------|
| <b>Command Modes</b> | CMTS tag configuration mode (config-cmts-tag). |
|----------------------|------------------------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCH    | This command was introduced. |

**Examples** The following example shows how to configure the **tlv** command:

```
Router# enable
Router(config)# cable tag 1
Router(config-cmts-tag)# tlv mracs 3
```

**Related Commands**

| Command          | Description                                                       |
|------------------|-------------------------------------------------------------------|
| <b>cable tag</b> | To configure a tag for a DOCSIS load balancing group on the CMTS. |

# tos

To configure the Type of Service (ToS) byte in the header of Layer 2 tunneled packets, use the **tos** command in DEPI tunnel configuration mode. To disable a configured ToS value, use the **no** form of this command.

**tos** *value*

**no tos** *value*

| Syntax Description | <i>value</i> Value of the ToS byte for IP packets in a Layer 2 Tunnel Protocol version 3 (L2TPv3) data session. The valid values range from 0 to 255. The default value is 0.                  |  |         |              |                    |                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------|--------------|--------------------|--------------------------------------------------------------------------------------|
| Command Default    | None                                                                                                                                                                                           |  |         |              |                    |                                                                                      |
| Command Modes      | DEPI tunnel configuration                                                                                                                                                                      |  |         |              |                    |                                                                                      |
| Command History    | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>12.2(33)SCC</td><td>This command was introduced.</td></tr></table>                                                                |  | Release | Modification | 12.2(33)SCC        | This command was introduced.                                                         |
| Release            | Modification                                                                                                                                                                                   |  |         |              |                    |                                                                                      |
| 12.2(33)SCC        | This command was introduced.                                                                                                                                                                   |  |         |              |                    |                                                                                      |
| Usage Guidelines   | The <b>tos</b> command allows you to manually configure the value of the ToS byte used in the headers of Layer 2 tunneled packets.                                                             |  |         |              |                    |                                                                                      |
| Examples           | The following example shows how to assign a ToS value of 100:<br><br>Router# <b>configure terminal</b><br>Router(config)# <b>depi-tunnel rf6</b><br>Router(config-depi-tunnel)# <b>tos 100</b> |  |         |              |                    |                                                                                      |
| Related Commands   | <table><tr><th>Command</th><th>Description</th></tr><tr><td><b>depi-tunnel</b></td><td>Specifies the name of the depi-tunnel and enters the DEPI tunnel configuration mode.</td></tr></table>  |  | Command | Description  | <b>depi-tunnel</b> | Specifies the name of the depi-tunnel and enters the DEPI tunnel configuration mode. |
| Command            | Description                                                                                                                                                                                    |  |         |              |                    |                                                                                      |
| <b>depi-tunnel</b> | Specifies the name of the depi-tunnel and enters the DEPI tunnel configuration mode.                                                                                                           |  |         |              |                    |                                                                                      |

## tos (multicast qos)

To set type of service (ToS) low byte, high byte, and mask values within a multicast QoS group, use the **tos** command in multicast QoS configuration mode. To disable the type of service, use the **no** form of this command.

**tos** *low-byte high-byte mask*

**no tos** *low-byte high-byte mask*

|                           |                  |                                                                                           |
|---------------------------|------------------|-------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>low-byte</i>  | Specifies the minimum ToS data bytes for a multicast QoS group. The valid range is 0–255. |
|                           | <i>high-byte</i> | Specifies the maximum ToS data bytes for a multicast QoS group. The valid range is 0–255. |
|                           | <i>mask</i>      | Specifies the ToS mask for a multicast QoS group. The valid range is 0–255.               |

|                        |                                                                    |
|------------------------|--------------------------------------------------------------------|
| <b>Command Default</b> | ToS parameters are not defined for a specific multicast QoS group. |
|------------------------|--------------------------------------------------------------------|

|                      |                                           |
|----------------------|-------------------------------------------|
| <b>Command Modes</b> | Multicast QoS configuration (config-mqos) |
|----------------------|-------------------------------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCA    | This command was introduced. |

|                         |                                                                                                                                                                                                           |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The three precedence bits in the ToS byte in the IP header specifies a class of service assignment for each packet. Those packets with the precedence bit set in the ToS field are given higher priority. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                                                                                                   |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example defines the low and high ToS rates and the mask value using the <b>tos</b> command:<br><br>Router(config)# <b>cable multicast qos group 20 priority 55 global</b><br>Router(config-mqos)# <b>tos 1 6 15</b> |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                                                 |                                                                             |
|-------------------------|-------------------------------------------------|-----------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>                                  | <b>Description</b>                                                          |
|                         | <b>cable multicast qos group</b>                | Specifies and configures a cable multicast QoS group.                       |
|                         | <b>show interface bundle multicast-sessions</b> | Displays multicast session information for a specific virtual cable bundle. |
|                         | <b>show interface cable multicast-sessions</b>  | Displays multicast session information for a specific cable interface.      |

# upgrade fpga auto-upgrade

To perform a firmware Field-Programmable Gate Array (FPGA) automatic upgrade on the PRE4 module on the Cisco uBR10012 router, use the **upgrade fpga auto-upgrade** command in privileged EXEC mode.

**upgrade fpga auto-upgrade { debug-off | debug-on | disable | enable | show }**

| Syntax Description | <b>debug-off</b> | Turns off debugging of the firmware FPGA auto upgrade of the PRE4 module. |
|--------------------|------------------|---------------------------------------------------------------------------|
|                    | <b>debug-on</b>  | Turns on debugging of the firmware FPGA auto upgrade of the PRE4 module.  |
|                    | <b>disable</b>   | Disables auto upgrade of the FPGA.                                        |
|                    | <b>enable</b>    | Enables auto upgrade of the FPGA.                                         |
|                    | <b>show</b>      | Displays information on the FPGA upgrade on the Cisco uBR10012 router.    |

|                        |                                          |
|------------------------|------------------------------------------|
| <b>Command Default</b> | FPGA auto upgrade is enabled by default. |
|------------------------|------------------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCG | This command was introduced. |

|                         |                                                                                                                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The FPGA auto upgrade feature enables automatic upgrade of the FPGA image on the PRE4 module on the Cisco uBR10012 router. To disable auto upgrade of the FPGA, use the <b>upgrade fpga auto-upgrade disable</b> command. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to activate the FPGA debugging on the Cisco uBR10012 router: |
|-----------------|----------------------------------------------------------------------------------------------|

```
Router# upgrade fpga auto-upgrade debug-on
Router#
```

The following example shows how to disable automatic upgrade of the FPGA firmware on the Cisco uBR10012 router:

```
Router# upgrade fpga auto-upgrade disable
```



The following example shows how to display the FPGA version, which is the FPGA in the flash on the PRE4 module:

```
Router# upgrade fpga auto-upgrade show

Alternative IOFPGA Running, version - 0x05111800
Default IOFPGA version - 0x00000000
Alternative IOFPGA version - 0x00000000
Bundle IOFPGA version - 0x0A0A0D01
IOFPGA auto-upgrade enabled - No
IOFPGA auto-upgrade debug - No
IOFPGA auto-upgrade test mode - (Default IOFPGA:flash image verify error)
```

Table 269 describes the significant fields shown in the display.

**Table 269** upgrade fpga auto-upgrade show Field Descriptions

| Field                               | Description                                                |
|-------------------------------------|------------------------------------------------------------|
| Alternative IOFPGA Running, version | Alternative IOFPGA image that is running, and its version. |
| Default IOFPGA version              | Default IOFPGA version.                                    |
| Alternative IOFPGA version          | Alternative IOFPGA version.                                |
| Bundled IOFPGA version              | Bundled IOFPGA version.                                    |
| IOFPGA auto-upgrade enabled         | IOFPGA auto-upgrade is enabled.                            |
| IOFPGA auto-upgrade debug           | IOFPGA debug is turned on.                                 |
| IOFPGA auto-upgrade test mode       | IOFPGA test mode is turned on.                             |

#### Associated Features

The **upgrade fpga auto-upgrade** command is used to automatically upgrade of the FPGA on the PRE4 module on the Cisco uBR10012 router.

- [Cisco uBR10012 Universal Broadband Router Performance Routing Engine Module](#)

#### Related Commands

| Command                  | Description                                                        |
|--------------------------|--------------------------------------------------------------------|
| <b>upgrade fpga file</b> | Upgrades the FPGA on the PRE4 module on the Cisco uBR10012 router. |

# upgrade fpga file

To upgrade the Field-Programmable Gate Array (FPGA) image on the Performance Routing Engine 4 (PRE4) module on the Cisco uBR10012 router, use the **upgrade fpga file** command in privileged EXEC mode.

**upgrade fpga** **{alt | def}** **file** *{url}* *{version}*

|                    |                |                                           |
|--------------------|----------------|-------------------------------------------|
| Syntax Description | <b>alt</b>     | Specifies the alternative IOFPGA version. |
|                    | <b>def</b>     | Specifies the default IOFPGA version.     |
|                    | <i>url</i>     | URL of the IOFPGA file.                   |
|                    | <i>version</i> | Version of the IOFPGA file.               |

**Command Default** FPGA is disabled by default.

**Command Modes** Privileged EXEC (#)

|                 |                |                                                                                |
|-----------------|----------------|--------------------------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                                            |
|                 | 12.2(33)SCB    | This command was introduced.                                                   |
|                 | 12.2(33)SCG    | This command is modified. The argument <i>version</i> is added to the command. |

**Usage Guidelines** Use this command to upgrade the FPGA image on the PRE4 module on the Cisco uBR10012 router.



## Note

In Cisco IOS Releases 12.2(33)SCG, you must specify the version of the IOFPGA file to manually upgrade the PRE4 module.

If you are using a PRE4 VE board and running Cisco IOS Release 12.2(33)SCG, use the **upgrade fpga {alt | def} file {url}** command to upgrade the PRE4 module.

**Examples** The following example shows how to upgrade the FPGA on the Cisco uBR10012 router:

```
Router# upgrade fpga alt file disk0:pre4_iofpga.bin 0x0A0A0D01
```

**Associated Features** The **upgrade fpga file** command is used to manually upgrade the FPGA on the PRE4 module on the Cisco uBR10012 router. For more information, see

- [Cisco uBR10012 Universal Broadband Router Performance Routing Engine Module](#)

| Related Commands | Command                              | Description                                                                               |
|------------------|--------------------------------------|-------------------------------------------------------------------------------------------|
|                  | <b>upgrade fpga<br/>auto-upgrade</b> | Performs automatic upgrade of the IOFPGA on the PRE4 module on the Cisco uBR10012 router. |

# upstream

To add upstream channels to an upstream bonding group, use the **upstream** command in upstream bonding configuration submode. To disable this configuration, use the **no** form of this command.

**upstream** *number*

**no upstream** *number*

## Syntax Description

|               |                                                          |
|---------------|----------------------------------------------------------|
| <i>number</i> | Upstream channel number. The valid range is from 0 to 7. |
|---------------|----------------------------------------------------------|

## Command Default

None

## Command Modes

Upstream bonding configuration submode (config-upstream-bonding)

## Command History

| Release     | Modification                                                  |
|-------------|---------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

## Usage Guidelines

DOCSIS 3.0-certified cable modems can support only four upstream channels on an upstream bonding group. These cable modems cannot accept additional upstream channels that you have added to an upstream bonding group.

## Examples

The following example shows how to add upstream channels to an upstream bonding group on a cable interface line card on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable7/1/0
Router(config-if)# cable upstream bonding-group 20
Router(config-upstream-bonding)# upstream 0
Router(config-upstream-bonding)# upstream 1
Router(config-upstream-bonding)# upstream 2
Router(config-upstream-bonding)# upstream 3
```

## Related Commands

| Command                             | Description                                                          |
|-------------------------------------|----------------------------------------------------------------------|
| <b>cable upstream bonding-group</b> | Creates an upstream bonding group on a cable interface.              |
| <b>cable fiber-node</b>             | Creates a fiber node and enters cable fiber-node configuration mode. |

## upstream (config-lb-group)

To set upstream channels in a DOCSIS load balancing group, use the **upstream** command in the config-lb-group configuration mode. To disable the upstream channel configuration, use the **no** form of this command.

### Cisco uBR10012 Router

**upstream cable** *slot/subslot/port upstream-list*

**no upstream cable** *slot/subslot/port upstream-list*

### Cisco uBR7225VXR and Cisco uBR7246VXR Routers

**upstream cable** *slot/port upstream-list*

**no upstream cable** *slot/port upstream-list*

| Syntax Description                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b> <i>slot/subslot/port</i> | Specifies the CMTS interface slot, subslot, and port number parameters. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. Ther permitted range is from 5 to 8.</li> <li><i>subslot</i>—Subslot where the line card resides. The available slots are 0 or 1.</li> <li><i>port</i>—The downstream controller number on the line card. The permitted <i>port</i> range is from 0 to 4.</li> </ul>                                                                                           |
| <b>cable</b> <i>slot/port</i>         | Specifies the CMTS interface slot and port number parameters on the Cisco uBR7246VXR or Cisco uBR7225VXR router. <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides.               <ul style="list-style-type: none"> <li>Cisco uBR7225VXR router—The valid range is from 1 to 2.</li> <li>Cisco uBR7246VXR router—The valid range is from 3 to 6.</li> </ul> </li> <li><i>port</i>—Downstream controller number on the line card. The permitted <i>port</i> values are 0 or 1.</li> </ul> |
| <i>upstream-list</i>                  | Upstream channel list ranging from 0 to 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Command Default** None

**Command Modes** DOCSIS load balancing group mode (config-lb-group)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

---

**Examples**

The following example shows how to set upstream channels in a DOCSIS LBG using the upstream command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# upstream cable 1/0/1 2
Router(config-lb-group)#
```

---

**Related Commands**

| Command                                     | Description                                                                                                              |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance docsis-group</b>      | Configures a DOCSIS load balancing group on the CMTS.                                                                    |
| <b>show cable load-balance docsis-group</b> | Displays real-time configurational, statistical, and operational information of load balancing operations on the router. |

# upstream cable connector

To configure an upstream cable connector for a fiber node, use the **upstream cable connector** command in cable fiber node configuration mode. To disable the configuration, use the **no** form of this command.

## Cisco uBR10012 Router

**upstream cable** *slot/subslot* **connector** *port-number*

**no upstream cable** *slot/subslot* **connector** *port-number*

## Cisco uBR7225VXR and Cisco uBR7246VXR Routers

**upstream cable** *slot* **connector** *port-number*

**no upstream cable** *slot* **connector** *port-number*

| Syntax Description               |                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                               |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b> <i>slot/subslot</i> | Identifies the cable interface on the Cisco uBR10012 router.                                                                                                                                        | <ul style="list-style-type: none"> <li><i>slot</i>—Chassis slot number of the cable interface line card. The valid range is from 5 to 8.</li> <li><i>subslot</i>—Secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> </ul>                |
| <b>cable</b> <i>slot</i>         | Identifies the cable interface on the Cisco uBR7246VXR or Cisco uBR7225VXR router.                                                                                                                  | <ul style="list-style-type: none"> <li><i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> <li>Cisco uBR7246VXR router: The valid range is from 3 to 6.</li> <li>Cisco uBR7225VXR router: The valid range is from 1 to 2.</li> </ul> </li> </ul> |
| <b>connector</b>                 | Specifies the physical upstream port connector on the cable interface line card.                                                                                                                    |                                                                                                                                                                                                                                                                               |
| <i>port-number</i>               | A range of physical port numbers on the cable interface line card. The <i>port-number</i> can be one or more port numbers or a range of port numbers separated by a hyphen or combinations of both. | <ul style="list-style-type: none"> <li>Cisco uBR10012 router—The valid range for port numbers is from 0 to 19.</li> <li>Cisco uBR7246VXR or Cisco uBR7225VXR router—The valid range for port numbers is from 0 to 7.</li> </ul>                                               |

**Command Default** None

**Command Modes** Cable fiber node configuration (config-fiber-node)

## ■ upstream cable connector

**Command History**

| Release     | Modification                                                     |
|-------------|------------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC.    |
| 12.2(33)SCD | Added support for Cisco uBR7246VXR and Cisco uBR7225VXR routers. |

**Examples**

The following example shows how to configure an upstream cable connector for a fiber node on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# cable fiber-node 2
Router(config-fiber-node)# upstream cable 5/0 connector 2
```

**Related Commands**

| Command                             | Description                                                          |
|-------------------------------------|----------------------------------------------------------------------|
| <b>cable upstream bonding-group</b> | Creates an upstream bonding group on a cable interface line card.    |
| <b>cable fiber-node</b>             | Creates a fiber node and enters cable fiber-node configuration mode. |



# upstream freq-range

To configure the Cisco CMTS router for the range of frequencies that are acceptable on upstreams, use the **upstream freq-range** command in global configuration mode. To restore the default value of North American ranges, use the **no** form of this command.

**upstream freq-range** [european | japanese | north american]

**no upstream freq-range**

## Syntax Description

|                       |                                                                                                                                          |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>european</b>       | Configures the Cisco CMTS router to accept upstream frequency ranges that conform with the EuroDOCSIS specifications (5 MHz to 65 MHz).  |
| <b>japanese</b>       | Configures the Cisco CMTS router to accept upstream frequency ranges that conform to the expanded range used in Japan (5 MHz to 55 MHz). |
| <b>north american</b> | Configures the Cisco CMTS router to accept upstream frequency ranges that conform to the DOCSIS specifications (5 MHz to 42 MHz).        |

## Defaults

North American (DOCSIS, 5 MHz to 42 MHz)

## Command Modes

Global configuration

## Command History

| Release     | Modification                                                                                         |
|-------------|------------------------------------------------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers. |

## Usage Guidelines

In Cisco IOS Release 12.2(15)BC2 and later, the Cisco CMTS router supports three different modes of operation, depending on the cable interface line cards being used. The range of frequencies that are allowed in each mode are as follows:

- North American DOCSIS (Annex B)—Upstreams use frequencies between 5 MHz and 42 MHz.
- European EuroDOCSIS (Annex A)—Upstreams use frequencies between 5 MHz and 65 MHz.
- Japanese Expanded Range (Annex B)—Upstreams use frequencies between 5 MHz and 55 MHz.

To configure the router so that it supports the proper range of upstream frequencies, use the **upstream freq-range** command. After you have configured the router with the **upstream freq-range** command, the **cable upstream frequency** command then accepts only frequencies that are in the configured range.



### Note

This command configures only the range of frequencies that can be configured on an upstream. It does not configure the upstreams for the DOCSIS (Annex B) or EuroDOCSIS (Annex A) modes of operation, which is done using the **cable downstream annex** interface command. (Annex C mode is not supported.)

The allowable range for the upstream channel frequency depends on the cable interface line card and Cisco IOS software release being used. See **Table 2-12 on page 2-367** for the currently supported values.

## Examples

The following example shows how to configure the Cisco CMTS router to support the EuroDOCSIS upstream frequency range of 5 MHz to 65 MHz:

```
Router# configure terminal
Router(config)# upstream freq-range european
Router(config)#
```

The following example shows how to configure the Cisco CMTS router to support the expanded Japanese upstream frequency range of 5 MHz to 55 MHz:

```
Router# configure terminal
Router(config)# upstream freq-range japanese
Router(config)#
```

The following example shows how to configure the Cisco CMTS router for its default configuration (DOCSIS upstream frequency range of 5 MHz to 42 MHz):

```
Router# configure terminal
Router(config)# upstream freq-range north american
Router(config)#
```

The following example shows all of the commands that are needed to configure the cable interface and upstream on a Cisco uBR-MC28U/X cable interface line card to support a frequency in the EuroDOCSIS upstream frequency range of 5 MHz to 65 MHz:

```
Router# configure terminal
Router(config)# upstream freq-range european
Router(config)# interface 3/0
Router(config-if)# cable downstream annex a
Router(config-if)# cable upstream 0 frequency 62500000
Router(config-if)#
```

## Related Commands

| Command                                            | Description                                                                                     |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>cable spectrum-group (global configuration)</b> | Creates spectrum groups, which contain one or more upstream frequencies.                        |
| <b>cable upstream frequency</b>                    | Configures a fixed frequency of the upstream radio frequency (RF) carrier for an upstream port. |
| <b>show controllers cable</b>                      | Displays information about the cable interface, including the upstream center frequency.        |

# voice-port

To enter voice-port configuration mode, use the **voice-port** command in global configuration mode.

**Cisco uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**voice-port** *number*

|                            |               |                                                                                                                                                                                 |
|----------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description:</b> | <i>number</i> | Identifies the voice port. Valid entries are <b>0</b> (which corresponds to the RJ-11 connector labeled V1) and <b>1</b> (which corresponds to the RJ-11 connector labeled V2). |
|----------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                |
|-----------------|--------------------------------|
| <b>Defaults</b> | No default behavior or values. |
|-----------------|--------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Global configuration |
|----------------------|----------------------|

|                        |                |                                                             |
|------------------------|----------------|-------------------------------------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                         |
|                        | 12.0(4)XI1     | Support was added for the Cisco uBR924 cable access router. |
|                        | 12.1(5)XU1     | Support was added for the Cisco CVA122 Cable Voice Adapter. |
|                        | 12.2(2)XA      | Support was added for the Cisco uBR925 cable access router. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Use the <b>voice-port</b> global configuration command to enter voice-port configuration mode. Use the <b>exit</b> command to exit the voice-port configuration mode and return to the global configuration mode. See the <i>Cisco IOS Multiservice Applications Command Reference</i> , available on Cisco.com and the Documentation CD-ROM for a list of subcommands that are supported by the <b>voice-port</b> command. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to enter the voice-port configuration mode for port 0, the first voice port (labeled “V1+V2”) on the router. |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# configure terminal
Router(config)# voice-port 0
Router(config-voice-port)#
```

|                         |                        |                                                                                                                             |
|-------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>         | <b>Description</b>                                                                                                          |
|                         | <b>dial-peer voice</b> | Enters dial-peer configuration mode, defines the type of dial peer, and defines the tag number associated with a dial peer. |

# vrf (multicast qos)

To specify the name for a virtual routing and forwarding (VRF) instance, use the **vrf** command in multicast QoS configuration mode. To disable the VRF instance, use the **no** form of this command.

**vrf** *name*

**no vrf** *name*

## Syntax Description

|             |                                                                                                                       |
|-------------|-----------------------------------------------------------------------------------------------------------------------|
| <i>name</i> | Specifies the routing and forwarding instance that is populated with multicast Virtual Private Network (MVPN) routes. |
|-------------|-----------------------------------------------------------------------------------------------------------------------|

## Command Default

A VRF name is not defined for the multicast QoS group.

## Command Modes

Multicast QoS configuration (config-mqos)

## Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SCA | This command was introduced. |

## Usage Guidelines

If a multicast QoS (MQoS) group is not defined for the named VRF instance, you will see an error message. You must either define a specific MQoS group for each VRF instance, or define a default MQoS that can be assigned in those situations where no matching MQoS group is found.

## Examples

The following example identifies a multicast QoS group VRF name using the **vrf** command:

```
Router(config)# cable multicast qos group 20 priority 55 global
Router(config-mqos)# vrf name1
```

## Related Commands

| Command                                         | Description                                                                 |
|-------------------------------------------------|-----------------------------------------------------------------------------|
| <b>cable multicast qos group</b>                | Specifies and configures a cable multicast QoS group.                       |
| <b>show interface bundle multicast-sessions</b> | Displays multicast session information for a specific virtual cable bundle. |
| <b>show interface cable multicast-sessions</b>  | Displays multicast session information for a specific cable interface.      |

## weekend duration

To configure different subscriber monitoring options over weekends on a Cisco CMTS router, use the **weekend duration** command in enforce-rule configuration mode. To remove the weekend monitoring configuration and to return to the same monitoring conditions for all days of the week, use the **no weekend** form of this command.

**weekend duration** *minutes* **avg-rate** *rate* **sample-interval** *interval* [**penalty** *duration*]  
{ **downstream** | **upstream** } [**enforce**]

**no weekend duration** *minutes* **avg-rate** *rate* **sample-interval** *interval* [**penalty** *duration*]  
{ **downstream** | **upstream** } [**enforce**]

**no weekend**

| Syntax Description |                                        |                                                                                                                                                                               |
|--------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <i>minutes</i>                         | Specifies the size of the sliding window (in minutes) during which subscriber usage is monitored. The valid range is 10 to 44640 with a default of 360 minutes (6 hours).     |
|                    | <b>avg-rate</b> <i>rate</i>            | Specifies the average sampling rate in kilobits per second for the specified duration. The valid range is 1 to 400000 kilobits with no default.                               |
|                    | <b>sample-interval</b> <i>interval</i> | Specifies how often (in minutes) the CMTS router should sample a service flow to get an estimate of subscriber usage. The valid range is 1 to 30, with a default value of 15. |
|                    | <b>penalty</b> <i>minutes</i>          | (Optional) Specifies the period (in minutes) during which a cable modem (CM) can be under penalty. The valid range is 1 to 10080.                                             |
|                    | <b>downstream</b>                      | Specifies monitoring of traffic in the downstream direction.                                                                                                                  |
|                    | <b>upstream</b>                        | Specifies monitoring of traffic in the upstream direction.                                                                                                                    |
|                    | <b>enforce</b>                         | (Optional) Specifies that the enforce-rule QoS profile should be applied automatically if a user violates their registered QoS profile.                                       |

**Command Default** Weekend monitoring is disabled.

**Command Modes** Enforce-rule configuration (enforce-rule)

| Command History | Release      | Modification                                 |
|-----------------|--------------|----------------------------------------------|
|                 | 12.3(23)BC2  | This command was introduced.                 |
|                 | 12.2(33)SCD2 | The <b>penalty</b> keyword option was added. |

## Usage Guidelines



### Note

This command is applicable only after the **monitoring-basics** command is configured with the keyword **legacy**.

The **weekend duration** command works similarly to the **duration** command for subscriber traffic monitoring. Use the **weekend duration** command when you want to configure different monitoring parameters for subscribers on weekends.

This command can only be used when you have already configured the **duration** or **peak-time1** commands as weekday monitoring conditions for an enforce-rule.

If you still want to monitor traffic over the weekend, but want to return to the same monitoring conditions for every day of the week, use the **no weekend** command. This command removes the weekend monitoring conditions, but still performs monitoring over the weekends according to the other monitoring options that you have configured in the enforce-rule.

If you want to disable monitoring entirely over the weekend, use the **weekend off** command.

The **penalty** duration, which is configured using the **weekend duration** command, is unique to weekends, and takes precedence over the global penalty duration configured using the **penalty-period** command.

## Examples

The following example specifies automatic monitoring of upstream traffic over the weekend if a subscriber is identified as violating their QoS profile. The monitoring will take place every 10 minutes and last for 5 minutes, with traffic sampled at an average rate of 2 kb/s:

```
Router(enforce-rule)# weekend duration 5 avg-rate 2 sample-interval 10 penalty 11 upstream
enforce
```

## Related Commands

| Command                   | Description                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>duration</b>           | Specifies the time period and sample rate to be used for monitoring subscribers.                                                                            |
| <b>peak-time1</b>         | Specifies peak and offpeak monitoring times on a Cisco CMTS router.                                                                                         |
| <b>penalty-period</b>     | Specifies the period during which an enforced quality of service (QoS) profile should be in force for subscribers who violate their registered QoS profile. |
| <b>weekend off</b>        | Disables peak and offpeak monitoring on weekends on a Cisco CMTS router.                                                                                    |
| <b>weekend peak-time1</b> | Configures peak and offpeak subscriber monitoring over weekends on a Cisco CMTS router.                                                                     |

# weekend off

To disable peak and offpeak monitoring on weekends on a Cisco CMTS router, use the **weekend off** command in enforce-rule configuration mode. To re-enable the configuration for weekend monitoring, use the **no** form of this command.

**weekend off**

**no weekend off**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Weekend monitoring is enabled once you configure the **weekend duration** or **weekend peak-time1** commands.

## Command Modes

Enforce-rule configuration (enforce-rule)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 12.3(23)BC2 | This command was introduced.                                                                                       |
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

Use the **weekend off** command to disable previously configured weekend monitoring and stop the CMTS router from monitoring cable modems (CMs) with that enforce-rule over the weekend. This command allows you to retain or modify your weekend monitoring configuration without enabling it for actual monitoring use on the CMTS router.

To perform weekend monitoring according to the same parameters used for weekday monitoring, use the **no weekend** command.

## Examples

The following example shows how to disable weekend monitoring when weekend peak-time monitoring has previously been configured on a Cisco CMTS router:

```
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# weekend peak-time1 8 duration 60 avg-rate 100 peak-time2 20 duration
60 avg-rate 10000 duration 90 avg-rate 20000 sample-interval 20 downstream enforce
Router(enforce-rule)# weekend off
```

## Related Commands

| Command                   | Description                                                                              |
|---------------------------|------------------------------------------------------------------------------------------|
| <b>weekend duration</b>   | Configures different subscriber monitoring options over weekends on a Cisco CMTS router. |
| <b>weekend peak-time1</b> | Configures peak and offpeak subscriber monitoring over weekends on a Cisco CMTS router.  |

# weekend peak-time1

To configure peak and offpeak subscriber monitoring over weekends on a Cisco CMTS router, use the **weekend peak-time1** command in enforce-rule configuration mode. To remove the peak and offpeak weekend monitoring configuration, use the **no** form of this command.

**weekend peak-time1** {*hour* | *hour:minutes*} **duration** *minutes* **avg-rate** *rate* [**peak-time2** {*hour* | *hour:minutes*} **duration** *minutes* **avg-rate** *rate*] [**duration** *offpeak-minutes* **avg-rate** *offpeak-rate*] **sample-interval** *minutes* [**penalty** *minutes*] {**downstream** | **upstream**}[**enforce**]

**no weekend peak-time1** {*hour* | *hour:minutes*} **duration** *minutes* **avg-rate** *rate* [**peak-time2** {*hour* | *hour:minutes*} **duration** *minutes* **avg-rate** *rate*][**duration** *offpeak-minutes* **avg-rate** *offpeak-rate*] **sample-interval** *minutes* [**penalty** *minutes*] {**downstream** | **upstream**}[**enforce**]

## Syntax Description

|                                        |                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>hour</i>   <i>hour:minutes</i>      | Specifies the time of day, in either hh or hh:mm format, during which monitoring occurs for the peak time.<br><br>If the time is specified in hour (hh), the valid range is 1 to 23 using a 24-hour clock.<br><br>If the time is specified in hour:minutes (hh:mm), the valid range for hour is 1 to 23 using a 24-hour clock, and the valid range for minutes is 0 to 59. |
| <b>duration</b> <i>minutes</i>         | Specifies the size of the sliding window (in minutes) during which the subscriber usage is monitored for the first peak time, and optionally for a second peak time when used with the <b>peak-time2</b> keyword. The valid range is 60 to 1440.                                                                                                                           |
| <b>avg-rate</b> <i>rate</i>            | Specifies the average sampling rate in kilobits per second for the specified duration. The valid range is 1 to 400000 kilobits with no default.                                                                                                                                                                                                                            |
| <b>duration</b> <i>offpeak-minutes</i> | (Optional) Specifies the size of the sliding window during which the subscriber usage is monitored for the remaining offpeak time (time not specified for peak monitoring). Valid range is 60 to 1440 minutes.                                                                                                                                                             |
| <b>avg-rate</b> <i>offpeak-rate</i>    | Specifies the average sampling rate in kilobits per second for the specified offpeak duration. The valid range is 1 to 400000 kilobits with no default.                                                                                                                                                                                                                    |
| <b>peak-time2</b>                      | (Optional) Specifies the time of day during which monitoring occurs for a second peak time. The time can be specified either in hours or hour:minutes format.                                                                                                                                                                                                              |
| <b>sample-interval</b> <i>minutes</i>  | Specifies how often (in minutes) the CMTS router should sample a service flow to get an estimate of subscriber usage. The valid range is 1 to 30, with a default value of 15.                                                                                                                                                                                              |
| <b>penalty</b> <i>minutes</i>          | (Optional) Specifies the period (in minutes) during which a cable modem can be under penalty. The range is 1 to 10080.                                                                                                                                                                                                                                                     |
| <b>downstream</b>                      | Specifies monitoring of traffic in the downstream direction.                                                                                                                                                                                                                                                                                                               |
| <b>upstream</b>                        | Specifies monitoring of traffic in the upstream direction.                                                                                                                                                                                                                                                                                                                 |
| <b>enforce</b>                         | (Optional) Specifies that the enforce-rule QoS profile should be applied automatically if a user violates their registered QoS profile.                                                                                                                                                                                                                                    |

## Command Default

Weekend monitoring is disabled. The only default value for the **weekend peak-time1** command is the 15-minute sample interval.



**Command Modes** Enforce-rule configuration (enforce-rule)

| Command History | Release      | Modification                                                                                                                                         |
|-----------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.3(23)BC2  | This command was introduced.                                                                                                                         |
|                 | 12.2(33)SCD2 | The minute-level granularity (hh:mm) for <b>weekend peak-time1</b> and <b>peak-time2</b> duration, and the <b>penalty</b> keyword option were added. |

### Usage Guidelines



#### Note

This command is applicable only after the **monitoring-basics** command is configured with the keyword **peak-offpeak**.

The **weekend peak-time1** command is similar to the **peak-time1** command for subscriber traffic monitoring. Use the **weekend peak-time1** command when you want to configure different peak and offpeak monitoring parameters for subscribers on weekends.

This command can only be used when you have already configured the **duration** or **peak-time1** commands as weekday monitoring conditions for an enforce-rule.

The **penalty** duration, which is configured using the **weekend peak-time1** command, is unique to weekends, and takes precedence over the global penalty duration configured using the **penalty-period** command.

### Examples

The following example shows configuration of two peak monitoring windows on the weekend, with the first monitoring period beginning at 8:00 A.M. for one hour and the second monitoring period beginning at 8:00 P.M. for one hour, and monitoring at all other times of the weekend for 1-1/2 hours (90 minutes) for downstream traffic. The unique penalty period for both **weekend peaktime1** and **peaktime2** is configured as 60 minutes:

```
Router(enforce-rule)# weekend peak-time1 8 duration 60 avg-rate 10000 peak-time2 20
duration 60 avg-rate 100 duration 90 avg-rate 20000 sample-interval 20 penalty 60
downstream enforce
```

| Related Commands | Command                 | Description                                                                                                                                              |
|------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>peak-time1</b>       | Specifies peak and offpeak monitoring times on a Cisco CMTS router.                                                                                      |
|                  | <b>weekend duration</b> | Configures different subscriber monitoring options over weekends on a Cisco CMTS router.                                                                 |
|                  | <b>penalty-period</b>   | Specifies the period for which an enforced quality of service (QoS) profile should be in force for subscribers who violate their registered QoS profile. |
|                  | <b>weekend off</b>      | Disables peak and offpeak monitoring on weekends on a Cisco CMTS router.                                                                                 |

■ weekend peak-time1



## Appendix A: Cable Debug Commands

**Revised: August 12, 2013, OL-15510-17**

Additional **debug** commands are documented in the *Cisco IOS Debug Command Reference*, available on Cisco.com and the Documentation CD-ROM.



**Caution**

The **debug** commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic. You should use caution when enabling debug messages because sending these messages to the console consumes system resources. Turning on too many types of debug messages can adversely affect the router's network performance, depending on what messages are being displayed and the type of traffic that is occurring.

### New Commands

| Command                                     | Cisco IOS Software Release |
|---------------------------------------------|----------------------------|
| <b>debug cable ipv6</b>                     | 12.2(33)SCA                |
| <b>debug cable service-ds-selection</b>     | 12.3(23)BC                 |
| <b>debug cr10k-rp dbs-queue</b>             | 12.3(23)BC1                |
| <b>debug ehhsa</b>                          | 12.2(33)SCA                |
| <b>debug cable wbcmts resiliency</b>        | 12.2(33)SCB                |
| <b>debug cable cm-ctrl</b>                  | 12.2(33)SCC                |
| <b>debug cable cm-status</b>                | 12.2(33)SCC                |
| <b>debug cable mdd</b>                      | 12.2(33)SCC                |
| <b>debug cable md-sg</b>                    | 12.2(33)SCC                |
| <b>debug cable ubg</b>                      | 12.2(33)SCC                |
| <b>debug cable wbcmts admission-control</b> | 12.2(33)SCC                |
| <b>debug pxf atom</b>                       | 12.2(33)SCC                |
| <b>debug cable dbs</b>                      | 12.2(33)SCD                |
| <b>debug cable multicast counter clear</b>  | 12.2(33)SCE                |
| <b>debug cable multicast counter start</b>  | 12.2(33)SCE                |
| <b>debug cable multicast counter stop</b>   | 12.2(33)SCE                |
| <b>debug cable multicast forwarding</b>     | 12.2(33)SCE                |

| Command                            | Cisco IOS Software Release |
|------------------------------------|----------------------------|
| debug cable multicast latency      | 12.2(33)SCE                |
| debug cable acfe filter            | 12.2(33)SCF                |
| debug cable acfe                   | 12.2(33)SCF                |
| debug cable dynamic-qos subscriber | 12.2(33)SCF                |
| debug cable dynamic-qos trace      | 12.2(33)SCF                |
| debug cmts ipc-cable base          | 12.2(33)SCF                |
| debug cmts ipc-cable client        | 12.2(33)SCF                |
| debug hccp rfs switch              | 12.2(33)SCG                |

#### Modified Commands

| Command                     | Cisco IOS Software Release |
|-----------------------------|----------------------------|
| debug cable wbcmts          | 12.2(33)SCB                |
| debug cr10k-rp dbs-queue    | 12.2(33)SCB                |
| debug hw-module all upgrade | 12.2(33)SCB                |
| debug hw-module bay         | 12.2(33)SCB                |
| debug hw-module subslot     | 12.2(33)SCB                |
| debug cable interface       | 12.2(33)SCC                |
| debug cable mac-scheduler   | 12.2(33)SCC                |
| debug cable tlvs            | 12.2(33)SCC                |
| debug cable ipv6            | 12.2(33)SCF1               |
| debug cable dsg             | 12.2(33)SCG                |

# debug c10k-jacket

To enable debugging information for the Wideband SIP, use the **debug c10k-jacket** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug c10k-jacket [events | plugin | spa-audits | spa-events | spa-vft]**

**no debug c10k-jacket**

|                    |                   |                                                                |
|--------------------|-------------------|----------------------------------------------------------------|
| Syntax Description | <b>events</b>     | Displays event information for the Wideband SIP.               |
|                    | <b>plugin</b>     | Displays plugging processing information for the Wideband SIP. |
|                    | <b>spa-audits</b> | Displays audit information for the Wideband SIP.               |
|                    | <b>spa-events</b> | Displays event information for the Wideband SIP.               |
|                    | <b>spa-vft</b>    | Displays vft information for the Wideband SIP.                 |

|                 |                                             |
|-----------------|---------------------------------------------|
| Command Default | No Wideband SIP debug messages are enabled. |
|-----------------|---------------------------------------------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |                |                                                            |
|-----------------|----------------|------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                        |
|                 | 12.3(21)BC     | This command was introduced for the Cisco uBR10012 router. |

|                  |                                                                                                |
|------------------|------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>debug c10k-jacket</b> command is intended for use by Cisco technical support personnel. |
|------------------|------------------------------------------------------------------------------------------------|

**Caution**

Because debugging output is assigned high priority in the CPU process, it can render the system unusable. For this reason, use **debug** commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco Systems technical support personnel. Moreover, it is best to use **debug** commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased debug command processing overhead will affect system use.

|          |                                                                                                                     |
|----------|---------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows how to enable the <b>debug c10k-jacket spa-vft</b> debug messages for the Wideband SIP. |
|----------|---------------------------------------------------------------------------------------------------------------------|

```
Router# debug c10k-jacket spa-vft
c10k jacket SPA VFT calls debugging is on
Router#
Sep 6 17:10:47.410: cr10k_wbcmts_rcv_spa_event: wbcmts spa event recv of type 3
Sep 6 17:10:47.410: NB chan stats: 1 entries.
Sep 6 17:10:47.414: cr10k_wbcmts_rcv_spa_event: wbcmts spa event recv of type 2
Sep 6 17:10:47.414: WB chan stats: 1 entries.
```

Related Commands

| Command             | Description                                          |
|---------------------|------------------------------------------------------|
| debug cable fn      | Enables debugging information for cable fiber nodes. |
| debug cable wbcmts  | Enables debugging information for the wideband CMTS. |
| debug hw-module bay | Enables debugging information for a Wideband SPA.    |

# debug cable

To enable debugging of the cable interface, use the **debug cable** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cable**

**no debug cable**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3 XA | This command was introduced. |

**Usage Guidelines** This command enables debugging of the cable interfaces. To avoid excessive output that could interfere with router performance, you should limit debugging to a particular cable interface, using the **debug cable interface** command, before giving the **debug cable** command.

**Examples** The following shows sample output from the **debug cable bpiatp** command:

```
Router# debug cable
Router# debug cable interface c3/0
CMTS interface debugging is on

Router#
Jun 25 08:36:37.339: cmts_helper_forward 00e0.a3b6.f0af no match

Jun 25 08:36:37.339: cmts_dhcp_glean: type=2 sid 0 IP=221.222.151.182 dhcp mac=0
Jun 25 08:36:40.339: cmts_helper_forward 00e0.a3b6.f0af no match

Jun 25 08:39:13.419: Failed to find CM with mac address 0006.28dc.37fd
Jun 25 08:39:13.419: Failed to find CM with mac address 00d0.bad3.c0cd
Jun 25 08:39:13.419: Failed to find CM with mac address 0003.e350.9cdb

Jun 25 08:39:40.527: Lookup failed - unable to find CM with SID 0

Jun 25 08:38:53.583: Lookup failed - unable to find CM with SID 0
```



**Note**

The last message displayed above, “unable to find CM with SID 0,” is typically generated by the **show cable** commands and can be ignored.

| Related Commands | Command                      | Description                                      |
|------------------|------------------------------|--------------------------------------------------|
|                  | <b>debug cable interface</b> | Enables debugging on a specific cable interface. |

**■**    **debug cable**



# debug cable acfe

To show the debug information related to the algorithm or interaction with the system, use the **debug cable acfe** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable acfe** [**algorithm** | **all** | **filter** | **hccp** | **process** | **read** | **topology** | **verbose** | **write**]

**no debug cable acfe**

| Syntax Description |  |                                                                                                                                           |
|--------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>algorithm</b>   |  | Displays internal operations of Fairness Across DOCSIS Interfaces feature algorithms.                                                     |
| <b>all</b>         |  | Displays debugging messages for all cable Fairness Across DOCSIS Interfaces feature events.                                               |
| <b>filter</b>      |  | Applies the filter to limit the debug output. See the <b>debug cable acfe filter</b> command.                                             |
| <b>hccp</b>        |  | Displays Fairness Across DOCSIS Interfaces feature high availability and Hot Standby Connection-to-Connection Protocol (HCCP) activities. |
| <b>process</b>     |  | Displays Fairness Across DOCSIS Interfaces feature process activities.                                                                    |
| <b>read</b>        |  | Displays input from system.                                                                                                               |
| <b>topology</b>    |  | Displays cluster building information.                                                                                                    |
| <b>verbose</b>     |  | Displays all Fairness Across DOCSIS Interfaces feature internal data.                                                                     |
| <b>write</b>       |  | Displays output to system.                                                                                                                |

|                        |                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------|
| <b>Command Default</b> | Debug is disabled and Fairness Across DOCSIS Interfaces feature messages are not displayed. |
|------------------------|---------------------------------------------------------------------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

|                         |                                                                                                                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | You should run the <b>debug cable acfe</b> command first to enable other debug options available in this command. Avoid enabling <b>all</b> and <b>verbose</b> options because they put a strain on the system resources. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following examples shows how to enable debug messages for Fairness Across DOCSIS Interfaces feature. |
|-----------------|----------------------------------------------------------------------------------------------------------|

The following is sample output from the **debug cable acfe** command with the **algorithm** keyword:

```
Router# debug cable acfe algorithm
```

```
ACFE Algorithms debugging is on
!
```

!  
!

The following is sample output from the **debug cable acfe** command with the **all** keyword:

Router# **debug cable acfe all**

```
Jan 20 10:18:52.266: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:18:52.266: ACFE: 0 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:18:52.266: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
Jan 20 10:18:52.266: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
Jan 20 10:18:52.266: ACFE: next interval 5000 ms
Jan 20 10:18:57.266: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:18:57.266: ACFE: 0 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:18:57.266: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
Jan 20 10:18:57.266: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
Jan 20 10:18:57.266: ACFE: next interval 5000 ms
Jan 20 10:19:02.271: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:19:02.271: ACFE: 0 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:19:02.271: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
Jan 20 10:19:02.271: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
Jan 20 10:19:02.271: ACFE: next interval 5000 ms
Jan 20 10:19:07.271: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:19:07.271: ACFE: 1 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:19:07.271: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
Jan 20 10:19:07.271: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
Jan 20 10:19:07.271: ACFE: next interval 5000 ms
Jan 20 10:19:12.271: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:19:12.271: ACFE: 0 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:19:12.271: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
Jan 20 10:19:12.271: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
Jan 20 10:19:12.271: ACFE: next interval 5000 ms
!
!
!
```

The following is sample output from the **debug cable acfe** command with the **hccp** keyword:

Router# **debug cable acfe hccp**

```
Jan 20 10:22:02.309: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
Jan 20 10:22:07.310: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
Jan 20 10:22:12.310: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
Jan 20 10:22:17.310: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
Jan 20 10:22:22.310: ACFE: sch_rp_sync_acfe_guar_grp LBLT quanta sync sent for
Modular-Cable 1/0/0
!
!
!
```

The following is sample output from the **debug cable acfe** command with the **process** keyword:

Router# **debug cable acfe process**

```
Jan 20 10:23:57.323: ACFE: Modular-Cable 1/0/0 is to be processed
```

```

Jan 20 10:23:57.323: ACFE: next interval 5000 ms
Jan 20 10:24:02.335: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:24:02.335: ACFE: next interval 5000 ms
Jan 20 10:24:07.335: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:24:07.335: ACFE: next interval 5000 ms
Jan 20 10:24:12.336: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:24:12.336: ACFE: next interval 5000 ms
Jan 20 10:24:17.336: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:24:17.336: ACFE: next interval 5000 ms
Jan 20 10:24:22.336: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:24:22.336: ACFE: next interval 5000 ms
Jan 20 10:24:27.336: ACFE: Modular-Cable 1/0/0 is to be processed
Jan 20 10:24:27.336: ACFE: next interval 5000 ms
!
!
!

```

The following is sample output from the **debug cable acfe** command with the **read** keyword:

```
Router# debug cable acfe read
```

```

Jan 20 10:25:27.349: ACFE: 1 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:25:27.349: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
Jan 20 10:25:32.349: ACFE: 0 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:25:32.349: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
Jan 20 10:25:37.349: ACFE: 0 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:25:37.349: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
Jan 20 10:25:42.349: ACFE: 0 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:25:42.349: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
Jan 20 10:25:47.349: ACFE: 1 flows on BG 1 on Modular-Cable1/0/0:0
Jan 20 10:25:47.349: ACFE: 9000 kbps CIR on BG 1 on Modular-Cable1/0/0:0 above reserved BW
!
!
!

```

The following is sample output from the **debug cable acfe** command with the **topology** keyword:

```
Router# debug cable acfe topology
```

```

ACFE Cluster Buidling debugging is on
!
!
!

```

The following is sample output from the **debug cable acfe** command with the **verbose** keyword:

```
Router# debug cable acfe verbose
```

```

Jan 20 10:30:02.413: ACFE: rf_chan_num 3 rf_idx 3 on Modular-Cable 1/0/0
Jan 20 10:30:07.414: ACFE: rf_chan_num 0 rf_idx 0 on Modular-Cable 1/0/0
Jan 20 10:30:07.414: ACFE: rf_chan_num 1 rf_idx 1 on Modular-Cable 1/0/0
Jan 20 10:30:07.414: ACFE: rf_chan_num 2 rf_idx 2 on Modular-Cable 1/0/0
Jan 20 10:30:07.414: ACFE: rf_chan_num 3 rf_idx 3 on Modular-Cable 1/0/0
Jan 20 10:30:07.414: ACFE: BG 1 with ratio 71612497920000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 0 with ratio 71607255040000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 2 with ratio 71602012160000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 2 with ratio 71602012160000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 0 with ratio 71607255040000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 1 with ratio 71612497920000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 1 with ratio 83844136960000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 0 with ratio 83838894080000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 2 with ratio 83838894080000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 0 with ratio 83838894080000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 2 with ratio 83838894080000 found as pivot
Jan 20 10:30:07.414: ACFE: BG 1 with ratio 83844136960000 found as pivot

```

debug cable acfe

```
Jan 20 10:30:07.414: ACFE: rf_chan_num 0 rf_idx 0 on Modular-Cable 1/0/0
Jan 20 10:30:07.414: ACFE: rf_chan_num 1 rf_idx 1 on Modular-Cable 1/0/0
Jan 20 10:30:07.414: ACFE: rf_chan_num 2 rf_idx 2 on Modular-Cable 1/0/0
Jan 20 10:30:07.414: ACFE: rf_chan_num 3 rf_idx 3 on Modular-Cable 1/0/0
Jan 20 10:30:12.414: ACFE: rf_chan_num 0 rf_idx 0 on Modular-Cable 1/0/0
Jan 20 10:30:12.414: ACFE: rf_chan_num 1 rf_idx 1 on Modular-Cable 1/0/0
Jan 20 10:30:12.414: ACFE: rf_chan_num 2 rf_idx 2 on Modular-Cable 1/0/0
Jan 20 10:30:12.414: ACFE: rf_chan_num 3 rf_idx 3 on Modular-Cable 1/0/0
Jan 20 10:30:12.414: ACFE: BG 1 with ratio 71612497920000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 0 with ratio 71607255040000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 2 with ratio 71602012160000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 2 with ratio 71602012160000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 0 with ratio 71607255040000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 1 with ratio 71612497920000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 1 with ratio 83844136960000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 0 with ratio 83838894080000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 2 with ratio 83838894080000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 0 with ratio 83838894080000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 2 with ratio 83838894080000 found as pivot
Jan 20 10:30:12.414: ACFE: BG 1 with ratio 83844136960000 found as pivot
Jan 20 10:30:12.414: ACFE: rf_chan_num 0 rf_idx 0 on Modular-Cable 1/0/0
Jan 20 10:30:12.414: ACFE: rf_chan_num 1 rf_idx 1 on Modular-Cable 1/0/0
Jan 20 10:30:12.414: ACFE: rf_chan_num 2 rf_idx 2 on Modular-Cable 1/0/0
Jan 20 10:30:12.414: ACFE: rf_chan_num 3 rf_idx 3 on Modular-Cable 1/0/0
!
```

The following is sample output from the **debug cable acfe** command with the **write** keyword:

```
Router# debug cable acfe write

ACFE Output debugging is on
!
```

Related Commands

| Command                 | Description                                                                         |
|-------------------------|-------------------------------------------------------------------------------------|
| debug cable acfe filter | Applies filters to the Fairness Across DOCSIS Interfaces feature debug information. |

# debug cable acfe filter

To apply filters to the Fairness Across DOCSIS Interfaces feature debug information and limit the output to a specific controller, cluster, or interface, use the **debug cable acfe** command in privileged EXEC mode. To disable the debugging output, use the **no** form of this command.

```
debug cable acfe filter {controller {modular-cable slot/subslot/controller-unit cluster
 cluster-index} | interface {integrated-cable | modular-cable | wideband-cable }
 slot/subslot/port:interface-num}
```

```
no debug cable acfe
```

| Syntax Description | filter     | Applies a filter to limit the debug output.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | controller | Displays the specific controller information. <ul style="list-style-type: none"> <li>• <b>modular-cable</b>—Specifies the controller interface.</li> <li>• <i>slot</i>—Controller slot number. The valid range is from 0 to 8.</li> <li>• <i>subslot</i>—Controller subslot number. The valid range is from 0 to 3.</li> <li>• <i>controller-unit</i>—Controller unit number. The valid value is 0.</li> <li>• <b>cluster</b>—Specifies the specific cluster.</li> <li>• <i>cluster-index</i>—Cluster index number.</li> </ul>                                                                                                                                                                                                                                                                                         |
|                    | interface  | Identifies the specific interface. <ul style="list-style-type: none"> <li>• <b>integrated-cable</b>—Specifies the integrated cable interface. This option is available only for the Cisco UBR-MC20X20V line card.</li> <li>• <b>modular-cable</b>—Specifies the modular cable interface.</li> <li>• <b>wideband-cable</b>—Specifies the wideband cable interface.</li> <li>• <i>slot</i>—Slot number of the cable interface.</li> <li>• <i>subslot</i>—Subslot number of the cable interface.</li> <li>• <i>port</i>—Port number.</li> <li>• <i>interface-num</i>—Interface number.</li> </ul> <p>The valid values for the above arguments depend on the CMTS router and cable interface line card. See the hardware documentation for your router chassis and cable interface line card for the supported values.</p> |

|                        |                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------|
| <b>Command Default</b> | Debug is disabled and Fairness Across DOCSIS Interfaces feature messages are not displayed. |
|------------------------|---------------------------------------------------------------------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

**Usage Guidelines**

You should run the **debug cable acfe** command first to enable the debug option. Avoid enabling **all** and **verbose** options because they put a strain on the system resources.

**Examples**

The following examples show how to enable debug messages for Fairness Across DOCSIS Interfaces feature.

The following is sample output from the **debug cable acfe filter** command with the **controller** keyword:

```
Router# debug cable acfe filter controller modular-Cable 1/0/0 cluster 0
```

The following is sample output from the **debug cable acfe filter** command with the **interface** keyword:

```
Router# debug cable acfe filter interface modular-Cable 1/0/0:0
```

**Related Commands**

| Command          | Description                                                            |
|------------------|------------------------------------------------------------------------|
| debug cable acfe | Enables debug operation for Fairness Across DOCSIS Interfaces feature. |

# debug cable admission-control

To enable automatic Admission Control troubleshooting processes on the Cisco CMTS, use the **debug cable admission-control** command in privileged EXEC mode. To disable debugging mode, use the **no** form of this command.

```
debug cable admission-control {cpu | memory | us-bandwidth | ds-bandwidth}
no debug cable admission-control
```

## Syntax Description

|                     |                                                                       |
|---------------------|-----------------------------------------------------------------------|
| <b>cpu</b>          | Keyword displays CPU debugging information and processes.             |
| <b>memory</b>       | Keyword displays physical memory debugging information and processes. |
| <b>us-bandwidth</b> | Keyword displays upstream debugging information and processes.        |
| <b>ds-bandwidth</b> | Keyword displays downstream debugging information and processes.      |

## Command Default

Admission Control and Service Flow Admission Control debugging is disabled by default.

## Command Modes

Privileged EXEC

## Command History

| Release     | Modification                                                                                                                               |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(13a)BC | This command was introduced on the Cisco uBR10012 and the Cisco uBR7246VXR router.                                                         |
| 12.3(21)BC  | This command continues on the Cisco uBR10012 router and the Cisco uBR7246VXR router to support the Service Flow Admission Control feature. |

## Usage Guidelines

Admission Control debugging processes have some impact to resources on the Cisco CMTS. Any one of the command options can be used for selective debugging and to minimize impact.

For additional Admission Control feature information, refer to the following document on Cisco.com:

- *Admission Control for the Cisco Cable Modem Termination System*

For additional information for Service Flow Admission Control, commencing in Cisco IOS Release 12.3(21)BC, refer to the following document on Cisco.com:

- *Service Flow Admission Control for the Cisco Cable Modem Termination System*

## Examples

The following example illustrates CPU debugging with Admission Control:

```
Router# debug cable admission control cpu
*Sep 12 23:08:53.255: CPU admission control check succeeded
*Sep 12 23:08:53.255: System admission control check succeeded
*Sep 12 23:08:53.255: CPU admission control check succeeded
*Sep 12 23:08:53.255: System admission control check succeeded
```

The following example illustrates memory debugging with Admission Control:

```
Router# debug cable admission control memory
*Sep 12 23:08:53.255: CPU admission control check succeeded
*Sep 12 23:08:53.255: System admission control check succeeded
*Sep 12 23:08:53.255: CPU admission control check succeeded
*Sep 12 23:08:53.255: System admission control check succeeded
```

The following example illustrates event debugging with Admission Control:

```
Router# debug cable admission control event
*Sep 12 23:15:22.867: Entering admission control check on PRE and it's a cm-registration
*Sep 12 23:15:22.867: Admission control event check is TRUE
```

The following example illustrates upstream throughput debugging with Admission Control:

```
Router# debug cable admission control us-bandwidth
Oct 8 23:29:11: Failed to allocate US bandwidth for CM 0007.0e01.9b45 in adding a new
service entry
```

The following example illustrates downstream throughput debugging with Admission Control:

```
Router# debug cable admission control ds-bandwidth
Oct 8 23:29:11: Failed to allocate DS bandwidth for CM 0007.0e01.1db5 in adding a new
service entry
```

#### Related Commands

| Command                                       | Description                                                                                                             |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>cable admission-control</b>                | Configures the CPU and memory thresholds for the Cisco CMTS and supporting broadband processing engines (BPEs)          |
| <b>cable admission-control event</b>          | Configures and enables Admission Control event types on the Cisco CMTS.                                                 |
| <b>cable admission-control ds-bandwidth</b>   | Configures Admission Control downstream bandwidth thresholds on the Cisco CMTS.                                         |
| <b>cable admission-control us-bandwidth</b>   | Configures Admission Control upstream bandwidth thresholds on the Cisco CMTS.                                           |
| <b>clear cable admission control counters</b> | Clears all Admission Control resource counters on the Cisco CMTS.                                                       |
| <b>show cable admission-control</b>           | Displays status information for running configuration, traffic metrics, and Admission Control events on the Cisco CMTS. |



# debug cable admission-control flow-categorization

To display service flow categorization results, enabled when a service flow is classified, use the **debug cable admission-control flow categorization** command in Privileged EXEC mode. This command displays the application by which it was categorized, along with which rule is matched. Use the **no** form of this command to disable this debugging.

**debug cable admission-control flow-categorization**

**no debug cable admission-control flow-categorization**

## Command Default

Debugging for Service Flow Admission Control is disabled by default on the Cisco CMTS, through Cisco IOS Release 12.3(21a) enables this feature by default, with associated default functions.

## Command Modes

Privileged EXEC

## Command History

| Release    | Modification                                                                               |
|------------|--------------------------------------------------------------------------------------------|
| 12.3(21)BC | This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router. |

## Usage Guidelines

For additional information for Service Flow Admission Control, commencing in Cisco IOS Release 12.3(21)BC, refer to the following document on Cisco.com:

- *Service Flow Admission Control for the Cisco Cable Modem Termination System*

## Examples

Below is a shortened example of the information displayed when the **debug cable admission-control flow-categorization** command is enabled on the Cisco CMTS. This command displays interface-level information.

```
Router# debug cable admission-control flow-categorization

int ca 5/1/1 sfid 55 identified as video pcmm priority 6 matched.
```

## Related Commands

| Command                                               | Description                                                                                                                                                                                                    |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable admission-control ds-bandwidth</b>           | Sets minor, major and exclusive thresholds for downstream voice or data bandwidth for each or all interfaces on the Cisco CMTS                                                                                 |
| <b>cable admission-control preempt priority-voice</b> | Changes the default PacketCable Emergency 911 call preemption functions on the Cisco CMTS, supporting throughput and bandwidth requirements for Emergency 911 calls above all other buckets on the Cisco CMTS. |
| <b>cable admission-control us-bandwidth</b>           | Configures global or interface-level upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS.                                                                                 |
| <b>cable application-type include</b>                 | Associates an application type with a specific and prioritized bucket on the Cisco CMTS.                                                                                                                       |
| <b>cable application-type name</b>                    | Assigns an alpha-numeric name for the specified bucket.                                                                                                                                                        |

| Command                                                   | Description                                                                                                                                                  |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable admission-control us-bandwidth</b>               | Configures per-upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS.                                                     |
| <b>debug cable admission-control flow-categorization</b>  | Displays service flow categorization results, enabled when a service flow is classified.                                                                     |
| <b>show application-buckets</b>                           | Displays rules for any or all buckets supporting Service Flow Admission Control on the Cisco CMTS.                                                           |
| <b>show interface cable admission-control reservation</b> | Displays service flows, categorizations, and bandwidth consumption on the Cisco CMTS, for the specified interface, and the specified service flow direction. |

# debug cable arp

To enable debugging of the Address Resolution Protocol (ARP) when it is used on the cable interface, use the **debug cable arp** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cable arp**

**no debug cable arp**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(11)BC3 | This command was introduced. |

**Usage Guidelines** The debug commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic. In particular, avoid using the **debug cable arp** command on an interface with a significant number of CMs, because the resulting volume of debug output could impact system performance. Cisco recommends that when you use the **debug cable arp** command, you limit its output to a particular interface or CM, using the **debug cable interface** or **debug cable mac-address** commands.

**Examples** The following shows typical output for a particular cable modem using the **debug cable arp** command:

```
Router# debug cable arp
CMTS arp debugging is on
```

```
Router# debug cable mac-address 0020.4072.7418
```

```
ARPGLEAN cmts glean idb Cable3/0 MAC 0020.4072.7418 SID 2 ipaddr 31.0.0.2
```

| Related Commands | Command                        | Description                                                                              |
|------------------|--------------------------------|------------------------------------------------------------------------------------------|
|                  | <b>debug cable dhcp</b>        | Enables debugging of the Dynamic Host Configuration Protocol on the cable interface.     |
|                  | <b>debug cable encap</b>       | Enables debugging of encapsulated packets that are transmitted over the cable interface. |
|                  | <b>debug cable interface</b>   | Enables debugging on a specific cable interface.                                         |
|                  | <b>debug cable mac-address</b> | Enables debugging for a particular CM.                                                   |

# debug cable arp filter

To display debugging messages about the filtering of Address Resolution Protocol (ARP) broadcasts, use the **debug cable arp filter** command in privileged EXEC mode. To the debugging messages, use the **no** form of this command.

- debug cable arp filter**
- no debug cable arp filter**

**Syntax Description**    This command has no arguments or keywords.

**Command Default**    No default behavior or values.

**Command Modes**    Privileged EXEC

| Command History | Release     | Modification                                                                                         |
|-----------------|-------------|------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC2 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers. |

**Usage Guidelines**    If you suspect a particular CM is generating a large volume of ARP traffic, you can enable debugging for that particular CM using the **debug cable arp** command. If the ARP traffic is excessive, you can enable ARP filtering on the associated cable interface using the **cable arp filter** command. To show the results of that ARP filtering, use the **debug cable arp filter** command.



Tip

Because this command can produce a large volume of debug information, it does not produce any output until you first limit debugging output to a particular Service ID (SID) or one or more particular CM MAC addresses, using the **debug cable interface sid** or **debug cable mac-address** commands, respectively.

**Examples**    The following example shows how to enable debugging messages for ARP filtering for a particular MAC address, and samples of the typical messages that can be displayed:

```
Router# debug cable mac-address 000C.0102.0304
Router# debug cable arp filter

CMTS arp filter debugging is ON

Router#

ARP Req Filter = T shdw 000C.0102.0304 sip 10.11.13.1 dhdw 00C0.0809.0A0B dip
192.168.100.14 cnt 2
ARP Req Filter = T src_ip 10.11.13.1 dst_ip 192.168.100.14
```

The following example shows how to enable debugging messages for ARP filtering for a particular SID on a cable interface:

```
Router# debug cable interface cable c5/0 sid 31
Router# debug cable arp filter
```

```
CMTS arp filter debugging is ON
```

```
Router#
```

**Related Commands**

| Command                        | Description                                                                                                                                       |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable arp</b>               | Activates cable Address Resolution Protocol (ARP).                                                                                                |
| <b>cable arp filter</b>        | Controls the number of ARP packets that are allowable for each Service ID (SID) on a cable interface.                                             |
| <b>cable proxy-arp</b>         | Activates cable proxy ARP on the cable interface.                                                                                                 |
| <b>cable arp</b>               | Clears the ARP table on the router.                                                                                                               |
| <b>clear counters</b>          | Clears the packet counters on all interfaces or on a specific interface.                                                                          |
| <b>debug cable arp</b>         | Enables debugging of ARP traffic on a cable interface.                                                                                            |
| <b>debug cable interface</b>   | Enables debugging for a particular Service ID (SID) on a specific cable interface.                                                                |
| <b>debug cable mac-address</b> | Enables debugging for a particular CM.                                                                                                            |
| <b>show cable arp-filter</b>   | Displays the total number of ARP replies and requests that have been sent and received, including the number of requests that have been filtered. |

# debug cable bpiatp

To enable debugging of the Baseline Privacy Interface (BPI) handler, use the **debug cable bpiatp** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cable bpiatp**  
**no debug cable bpiatp**

**Syntax Description**    This command has no arguments or keywords.

**Command Modes**    Privileged EXEC

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3 XA | This command was introduced. |

**Usage Guidelines**    This command activates debugging of the BPI feature. When this command is activated, the Cisco CMTS displays debugging information for any BPI-related messages that the CMTS sends or receives.



**Note**    This command is supported only on images that support BPI or BPI+ encryption.



**Tip**    Debugging must be enabled for one or more cable interfaces, using the **debug cable interface** command, before the **debug cable bpiatp** command displays any output.

**Examples**    The following shows sample output from the **debug cable bpiatp** command:

```
Router# debug cable interface c3/0
Router# debug cable bpiatp

CMTS bpi_atp debugging is on
Router#
 SID : 1 Latest : 2 Current : 1
 Status[0] : 1 DES Key[0] : DBF08460BF8073B DES IV[0] : D8F26C81A2F01BC
 Key Life[0]: 392 sec
 Status[1] : 1 DES Key[1] : BEC1CAE02022349 DES IV[1] : 198C1AB9255113DC
 Key Life[1]: 87 sec
 Req : 1 Rply : 1 Rej : 0 Inv : 0
 Upstream Pri SID : 1
 SID : 1 Even Key : D7C2230BF019D02 Even IV : D8F26C81A2F01BC
 SID : 1 Odd Key : BD875702048A401 Odd IV : 198C1AB9255113DC

 SID : 2002 Latest : 2 Current : 1
 Status[0] : 1 DES Key[0] : 237C029E0879190B DES IV[0] : 166B0B6207580457
 Key Life[0]: 219 sec
 Status[1] : 1 DES Key[1] : B8020021FDF1AB5 DES IV[1] : 7A10B6E235E196E
```

```
Key Life[1]: 69 sec
CM List:
 0050.f112.3414
IP List:
 224.0.1.3
Req : 0 Rply : 0 Rej : 0 Inv : 0
Upstream QoS SID : 0
 SID : 0 Even Key : FFFF0000FFFF0000 Even IV : FFFF0000FFFF0000
 SID : 0 Odd Key : FFFF0000FFFF0000 Odd IV : FFFF0000FFFF0000
```

**Related Commands**

| Command                      | Description                                                                          |
|------------------------------|--------------------------------------------------------------------------------------|
| <b>debug cable interface</b> | Enables debugging on a specific cable interface.                                     |
| <b>debug cable keyman</b>    | Displays debugging information about BPI key management.                             |
| <b>debug cable privacy</b>   | Displays debugging information whenever the BPI state changes or a BPI event occurs. |

# debug cable bundle

To enable debugging of the bundling of cable interfaces, use the **debug cable bundle** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

```
debug cable bundle [pkt]

no debug cable bundle [pkt]
```

|                    |                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------|
| Syntax Description | pkt (Optional) Displays detailed information about packets that are transmitted over the cable bundle. |
|--------------------|--------------------------------------------------------------------------------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |                                   |                                 |
|-----------------|-----------------------------------|---------------------------------|
| Command History | Release                           | Modification                    |
|                 | 12.0(7)XR, 12.1(0)6SC, 12.1(2)EC1 | This command was introduced.    |
|                 | 12.1(3a)EC                        | Subinterface support was added. |

|                  |                                                                                                                                                          |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command activates debugging for cable interfaces that are bundled together into a master/slave relationship, using the <b>cable bundle</b> command. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|



Note

The **debug cable bundle pkt** command does not display information about multicast packets on the Cisco uBR10012 router. Use the **show ip mroute count** and **show hardware pxf cpu mroute** commands to display this information on the Cisco uBR10012 router.



Tip

This command can generate a significant amount of output. To limit the debug output to a specific cable interface, use the **debug cable interface** command, before using the **debug cable bundle** command.

|          |                                                                                                                 |
|----------|-----------------------------------------------------------------------------------------------------------------|
| Examples | The following shows typical output from the <b>debug cable bundle</b> command for a particular cable interface: |
|----------|-----------------------------------------------------------------------------------------------------------------|

```
Router# debug cable interface c3/0
Router# debug cable bundle

00:53:23: Sending multicast packet to bundle int Cable3/0
00:53:23: Unicast packet sent out bundle int Cable3/0 to 0003.e3fa.5e21
00:53:24: Sending multicast packet to bundle int Cable3/0
00:53:25: Sending multicast packet to bundle int Cable3/0
00:53:26: Sending multicast packet to bundle int Cable3/0

Router#
```



| Related Commands | Command               | Description                                      |
|------------------|-----------------------|--------------------------------------------------|
|                  | debug cable interface | Enables debugging on a specific cable interface. |

# debug cable cm-status

To enable debugging information for cable modem (CM) status messages on the Cisco CMTS routers, use the **debug cable cm-status** command in privileged EXEC mode. To stop the display of debug messages, use the **no** form of this command.

```
debug cable cm-status

no debug cable cm-status
```

**Syntax Description**      This command has no arguments or keywords.

**Command Modes**          Privileged EXEC (#)

| Command History | Release     | Modification                                                  |
|-----------------|-------------|---------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Examples**                      The following example shows how to enable debugging output using the **debug cable cm-status** command:

```
Router# debug cable cm-status

CMTS CM-STATUS message debugging is on

Apr 27 07:01:21.659: cmts_send_cm_status_test_msg: SEND IPC to Cable5/0/1 type 139 if_num
1 len 272
Apr 27 07:01:21.631: Cable5/0/1: CM 001e.6bfa.f5bc CM-STATUS msg
Apr 27 07:01:21.631: CM-STATUS:
Apr 27 07:01:21.631: 0x0000: 01 03 05 01 01
Apr 27 07:01:21.631: Send T4 Timeout to USR event handling
```

| Related Commands | Command                        | Description                                                                                                        |
|------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------|
|                  | <b>debug cable interface</b>   | Enables debugging output for a specific cable interface.                                                           |
|                  | <b>debug cable mac-address</b> | Enables debugging output for the cable modems that match the specified hardware MAC address or range of addresses. |
|                  | <b>debug cable cm-ctrl</b>     | Enables debugging output for the CM-CTRL messages on the Cisco CMTS routers.                                       |

# debug cable classifiers

To display debugging messages for DOCSIS packet classifiers, use the **debug cable classifiers** command in privileged EXEC mode. To stop the display of debugging messages, use the **no** form of this command.

**debug cable classifiers**

**no debug cable classifiers**

|                           |                                                           |
|---------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | No additional keywords or syntax components are required. |
|---------------------------|-----------------------------------------------------------|

|                      |                      |
|----------------------|----------------------|
| <b>Command Modes</b> | Privileged EXEC mode |
|----------------------|----------------------|

|                        |                                                            |
|------------------------|------------------------------------------------------------|
| <b>Command Default</b> | DOCSIS packet classifier debugging is disabled by default. |
|------------------------|------------------------------------------------------------|

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>The <b>debug cable classifiers</b> command provides detailed information about the allocation, removal, activation and deactivation of packet classifiers. Generally, classifiers are used to identify IP packets by source port, destination port, or type of service. Classifiers are associated with service flows. For example, packet classifiers are dynamically created in most VOIP deployments and this debug command can be used to troubleshoot issues related to these classifiers as VOIP calls are created and torn down.</p> <p>Because this command can produce a large volume of debug information, use this command only when you have also enabled debugging for a particular MAC address, set of MAC addresses, or a MAC address mask, using the <b>debug cable mac-address</b> command.</p> |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                              |
|-----------------|------------------------------------------------------------------------------|
| <b>Examples</b> | The following example enables classifier debugging for a single MAC address: |
|-----------------|------------------------------------------------------------------------------|

```
Router# debug cable mac-address 000a.73fa.dbaa
Router# debug cable classifiers
CMTS Packet Classifiers debugging is on
```

The following enables classifier debugging for all MAC addresses with Organizational Unique Identifier (OUI) OUI 0013.11:

```
Router# debug cable mac-addr 0013.1100.0000 ffff.ff00.0000
Routerv# debug cable classifiers
CMTS Packet Classifiers debugging is on
```

The following example illustrates sample output of the **debug cable classifiers** command for the given MAC addresses:

```
Feb 7 18:43:50.181: CFR cmts_deactivate_us_srv_flow_act_cfrs 000a.73fa.dbaa sid 1 sfid 3 st 2 dir 0 prov 1 adm 1 act 1
Feb 7 18:43:50.181: CFR cmts_remove_cm_srv_flow_cfrs 000a.73fa.dbaa sid 1 sfid 3 st 2 dir 0 prov 1 adm 0 act 0
Feb 7 18:43:50.181: CFR cmts_deactivate_ds_srv_flow_act_cfrs 000a.73fa.dbaa sid 0 sfid 4 st 2 dir 1 prov 2 adm 2 act 2
Feb 7 18:43:50.181: CFR cmts_remove_cm_srv_flow_cfrs 000a.73fa.dbaa sid 0 sfid 4 st 2 dir 1 prov 2 adm 0 act 0
Feb 7 18:43:50.181: CFR cmts_deactivate_us_srv_flow_act_cfrs 000a.73fa.dbaa sid 1 sfid 3 st 2 dir 0 prov 3 adm 0 act 0
Feb 7 18:43:50.181: CFR cmts_deactivate_us_srv_flow_act_cfrs 000a.73fa.dbaa sid 1 sfid 3 st 1 dir 0 prov 3 adm 3 act 0
Feb 7 18:43:50.181: CFR cmts_activate_us_srv_flow_act_cfrs 000a.73fa.dbaa sid 1 sfid 3 st 2 dir 0 prov 3 adm 3 act 3
```

**debug cable classifiers**

```
Feb 7 18:43:50.181: CFR cmts_deactivate_ds_srv_flow_act_cfrs 000a.73fa.dbaa sid 0 sfid 4 st 2 dir 1 prov 4 adm 0 act 0
Feb 7 18:43:50.181: CFR cmts_deactivate_ds_srv_flow_act_cfrs 000a.73fa.dbaa sid 0 sfid 4 st 1 dir 1 prov 4 adm 4 act 0
Feb 7 18:43:50.181: CFR cmts_activate_ds_srv_flow_act_cfrs 000a.73fa.dbaa sid 0 sfid 4 st 2 dir 1 prov 4 adm 4 act 4
Feb 7 18:43:50.181: CFR cmts_set_cfr_params 000a.73fa.dbaa cfrid 1 pri 0 ord 0 dir 0 st 2 phsi 0
Feb 7 18:43:50.181: CFR cmts_activate_cfr 000a.73fa.dbaa cfrid 1 pri 1 ord 0 dir 0 st 2
Feb 7 18:43:50.181: CFR cmts_add_pkt_cfr 000a.73fa.dbaa cfrid 1 pri 1 ord 0 dir 0 st 1 phsi 0
Feb 7 18:43:50.181: CFR cmts_handle_cfr_parsed_data CFR_ADD 000a.73fa.dbaa sfid 0 action 0 dir 0 type 0 cfrid 0 pri 1 ord 0 dir 0 st 1 phsi 0
Feb 7 18:43:50.181: CFR cmts_set_cfr_params 000a.73fa.dbaa cfrid 2 pri 0 ord 0 dir 1 st 2 phsi 0
Feb 7 18:43:50.181: CFR cmts_activate_cfr 000a.73fa.dbaa cfrid 2 pri 1 ord 0 dir 1 st 2
Feb 7 18:43:50.181: CFR cmts_add_pkt_cfr 000a.73fa.dbaa cfrid 2 pri 1 ord 1 dir 1 st 1 phsi 0
Feb 7 18:43:50.181: CFR cmts_handle_cfr_parsed_data CFR_ADD 000a.73fa.dbaa sfid 0 action 0 dir 1 typ
```

**Related Commands**

| Command                   | Description                                                          |
|---------------------------|----------------------------------------------------------------------|
| <b>debug cable dynsrv</b> | Displays information about DOCSIS 1.1 dynamic service flow messages. |
| <b>debug cable qos</b>    | Activates quality-of-service (QoS) debugging.                        |

# debug cable cm-ctrl

To enable debugging information for CM-CTRL messages on the Cisco CMTS routers, use the **debug cable cm-ctrl** command in privileged EXEC mode. To stop the display of debug messages, use the **no** form of this command.

**debug cable cm-ctrl**

**no debug cable cm-ctrl**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                  |
|-------------|---------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

## Examples

The following example shows how to enable debugging information for CM-CTRL messages using the **debug cable cm-ctrl** command:

```
Router# debug cable cm-ctrl
```

```
CMTS CM-CTRL message debugging is on
```

```
Apr 27 06:53:54.695: CM-CTRL-REQ IPC Msg:
*Apr 27 06:53:54.695: 0x0000: 01 06 00 1E 6B FA F5 BC 02 02 00 00 03 04 00 00
*Apr 27 06:53:54.695: 0x0010: 13 88 04 02 00 00 05 01 00 06 01 01 07 01 03 08
*Apr 27 06:53:54.695: 0x0020: 01 02 0B 01 01
Apr 27 06:53:54.647: cmts_clc_proc_cm_ctrl_req called
Apr 27 06:53:54.647: cmts_clc_proc_cm_ctrl_req: calling cmts_cm_ctrl_handle_ipc bdy_len 37
Apr 27 06:53:54.647: CM-CTRL-IPC Recv:
Apr 27 06:53:54.647: 0x0000: 01 06 00 1E 6B FA
F5 BC 02 02 00 00 03 04 00 00
Apr 27 06:53:54.647: 0x0010: 13 88 04 02 00 00 05 01 00 06 01 01 07 01 03 08
Apr 27 06:53:54.647: 0x0020: 01 02 0B 01 01
Apr 27 06:53:54.647: CM-CTRL IPC encode MAC: 001e.6bfa.f5bc, timeout: 5000, retry: 0,
Apr 27 06:53:54.647: CM-CTRL IPC encode tid: 0, pending: 0, num_tlvs: 1,
Apr 27 06:53:54.647: CM-CTRL-REQ CM node: Cable5/0/1, CM 001e.6bfa.f5bc is enqueued
Apr 27 06:53:54.651: CM-CTRL encode MAC: 001e.6bfa.f5bc, timeout: 5000, retry: 0,
Apr 27 06:53:54.651: CM-CTRL encode tid: 0, pending: 0, num_tlvs: 1,
Apr 27 06:53:54.651: TLV[0]: type 3, result: 2, value: 0x01000000
Apr 27 06:53:54.651: CM-CTRL: Cable5/0/1 CM 001e.6bfa.f5bc control bitmask: 0x07FE
Apr 27 06:53:54.651: CM-CTRL-REQ TLV:
Apr 27 06:53:54.651: 0x0000: 03 01 01
Apr 27 06:53:54.651: CM-CTRL-REQ Msg:
Apr 27 06:53:54.651: 0x0000: C2 00 00 1D 00 00 00 1E 6B FA F5 BC 00 19 2F E6
Apr 27 06:53:54.651: 0x0010: 06 79 00 0B 00 00 03 04 2A 00 00 00 03 01 01
Apr 27 06:53:54.651: CM-CTRL-REQ: Cable5/0/1, CM 001e.6bfa.f5bc enqueued locally
Apr 27 06:53:54.651: CM-CTRL-RSP Timer started.
Apr 27 06:53:54.651: CM-CTRL-REQ is sent to CM.
Apr 27 06:53:54.659: cmts_cm_ctrl_rsp called
Apr 27 06:53:54.659: Received CM-CTRL-RSP msg from 001e.6bfa.f5bc transaction id (0)
```

**debug cable cm-ctrl**

```
Apr 27 06:53:54.659: CM-CTRL-RSP:
Apr 27 06:53:54.659: 0x0000: C2 00 00 1D 9C 24 00 19 2F E6 06 79 00 1E 6B FA
Apr 27 06:53:54.659: 0x0010: F5 BC 00 0B 00 00 03 04 2B 00 00 00 03 01 00
Apr 27 06:53:54.659: CM-CTRL-RSP: Cable5/0/1 CM 001e.6bfa.f5bc timeout 5000 retry 0.
Apr 27 06:53:54.659: CM-CTRL-RSP:
Apr 27 06:53:54.659: 0x0000: 03 01 00
Apr 27 06:53:54.659: CM-CTRL-REQ MAC: 001e.6bfa.f5bc, timeout: 5000, retry: 0,
Apr 27 06:53:54.659: CM-CTRL-REQ tid: 0, pending: 1, num_tlvs: 1.
Apr 27 06:53:54.659: CM-CTRL decode req_msg->tid: 0, rsp_msg->tid: 0.
Apr 27 06:53:54.659: TLV CM reinitialize Success
```

| Related Commands | Command                 | Description                                                                                                        |
|------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------|
|                  | debug cable interface   | Enables debugging output for a specific cable interface.                                                           |
|                  | debug cable mac-address | Enables debugging output for the cable modems that match the specified hardware MAC address or range of addresses. |
|                  | debug cable cm-status   | Enables debugging output for CM status messages on the Cisco CMTS routers.                                         |

# debug cable config-file

To display information about the DOCSIS configuration files that CMTS generates internally, use the **debug cable config-file** command in the Privileged EXEC mode. To disable the debugging output, use the **no** form of this command.

**Note**

This command applies to configuration files created using the internal DOCSIS configuration file editor and the “cable dynamic-secret” functionality.

**debug cable config-file**

**no debug cable config-file**

**Syntax Description**

This command has no arguments or keywords.

**Defaults**

No default behavior or values.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                             |
|-------------|--------------------------------------------------------------------------|
| 12.1(2)EC   | This command was introduced for Cisco uBR7200 series routers.            |
| 12.1(5)EC   | Support for this command was added for the Cisco uBR7100 series routers. |
| 12.2(4)BC1  | Support was added to the Release 12.2 BC.                                |
| 12.2(11)BC2 | Support for this command was added to the Release 12.2 BC.               |

**Usage Guidelines**

This command shows the DOCSIS configuration files debug messages that the Cisco CMTS generated internally. These configuration files may be generated with the internal configuration file editor using the **cable config-file** command and its subcommands, or through the “dynamic shared secret” functionality using the **cable dynamic-secret** command.

**Caution**

The debug commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic.

Examples

The following example enables debugging for the internally generated configuration files using the conditional and config-file debug command.

Enable conditional debugs using one of the following commands:

```
Router# debug cable mac-address 0000.aaaa.bbbb
```

or

```
Router# debug cable interface cable 6/1/0 verbose
```

Enable the config-file debug using the following commands:

```
Router# debug cable config-file
```

```
CMTS config file debugging is on
```

```
Router# show debug
```

```
CMTS:
```

```
 CMTS config file debugging is on
```

```
CMTS specific:
```

```
 Debugging is on for Address 0000.aaaa.bbbb, Mask ffff.ffff.ffff
```

```
Router#
```

When debugging is turned on and the Cisco CMTS internally generates a DOCSIS configuration file for transmission to a CM that matches the conditional debug, the CMTS displays the following message:

```
Server instance created for modem 001a.c3ff.e3f0. Local 3.0.0.1 Read request from CM
001a.c3ff.e3f0 (3.0.0.119) File successfully downloaded to CM 001a.c3ff.e3f0
```

When debugging is turned on and a **verbose** keyword is used in the conditional debugs, the Cisco CMTS displays the following message:

```
Server instance created for modem 001a.c3ff.e3f0. Local 3.0.0.1
config: Searching download image for 001a.c3ff.e3f0: not found Generated tftp config file:
0x0000: 03 01 01 04 1F 01 01 01 02 04 05 F5 E1 00 03 04
0x0010: 05 F5 E1 00 04 01 00 05 04 00 00 00 00 06 02 07
0x0020: D0 07 01 01 11 2A 01 04 00 00 00 0A 02 04 00 00
0x0030: 00 0A 03 04 00 00 02 58 04 04 00 00 00 01 05 04
0x0040: 00 00 00 01 06 04 00 00 02 58 07 04 00 00 00 3C
0x0050: 12 01 0A 06 10 D8 CB DD 33 6A 2D 49 AE E1 EE DE
0x0060: 1D E5 90 4A 35 07 10 69 7B F1 67 8A 82 F0 74 F0
0x0070: 0D A1 89 B3 8D 9C F7 FF
Config file for 001a.c3ff.e3f0, Size 120 Read request from CM 001a.c3ff.e3f0 (3.0.0.119)
TFTP Server: Sent OACK to CM 001a.c3ff.e3f0 TFTP Server: ACK from CM 001a.c3ff.e3f0 for
block 0 Sending block 1, Size 120 to CM 001a.c3ff.e3f0 TFTP Server: ACK from CM
001a.c3ff.e3f0 for block 1 File successfully downloaded to CM 001a.c3ff.e3f0
```



Note

See the DOCSIS 1.1 specification (revision SP-RFIV1.1-I05-000714 and above) for a description of the fields that can appear in a DOCSIS configuration file.

Related Commands

|                          |                                                                         |
|--------------------------|-------------------------------------------------------------------------|
| <b>cable config-file</b> | Creates a DOCSIS configuration file and enters configuration file mode. |
| <b>access-denied</b>     | Disables access to the network.                                         |
| <b>channel-id</b>        | Specifies upstream channel ID.                                          |
| <b>cpe max</b>           | Specifies the maximum number of CPE devices allowed access.             |



|                                |                                                                                                                                                 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>debug cable interface</b>   | Displays debug messages for a specific cable interface, or for traffic related to a specific MAC address or Service ID (SID) on that interface. |
| <b>debug cable mac-address</b> | Displays debug information for a specific CM.                                                                                                   |
| <b>download</b>                | Specifies the filename and server IP address for downloading a new software image.                                                              |
| <b>frequency</b>               | Specifies the downstream frequency.                                                                                                             |
| <b>option</b>                  | Specifies options for the configuration file that are not provided for by the other commands.                                                   |
| <b>privacy</b>                 | Specifies privacy options for baseline privacy images.                                                                                          |
| <b>service-class</b>           | Specifies service class definitions for the configuration file.                                                                                 |
| <b>snmp manager</b>            | Specifies Simple Network Management Protocol (SNMP) options.                                                                                    |
| <b>time-stamp</b>              | Enables time-stamp generation.                                                                                                                  |
| <b>show running-config</b>     | Displays the current run-time configuration, which includes defined configuration files.                                                        |
| <b>show startup-config</b>     | Displays the current saved configuration, which includes defined and saved configuration files.                                                 |

# debug cable dbs

To display debugging messages for Dynamic Bandwidth Sharing (DBS), use the **debug cable dbs** command in privileged EXEC mode. To disable DBS debugging, use the **no** form of this command.

**debug cable dbs**

**no debug cable dbs**

**Syntax Description**    This command has no arguments or keywords.

**Command Default**    DBS debugging is disabled.

**Command Modes**    Privileged EXEC (#)

| Command History | Release     | Modification                                                                      |
|-----------------|-------------|-----------------------------------------------------------------------------------|
|                 | 12.2(33)SCD | This command was introduced on the Cisco uBR7225VXR and Cisco uBR7246VXR routers. |

**Usage Guidelines**    This command is used only on the Cisco uBR7225VXR and Cisco uBR7246VXR routers.

Because this command can produce a large volume of information, use this command only when you have also enabled debugging for a particular interface, using the **debug cable interface** command.

**Examples**    The following example shows how to enable debugging output using the **debug cable dbs** command:

```
Router# debug cable dbs

DBS for cable 8x8 LC debugging is on

The following sample shows the DBS debug output:

Router# conf t
Router(config)# interface integrated-Cable 5/0:0
Router(config-if)# shutdown
Router(config-if)# cable dynamic-bw-sharing
Router(config-if)# no shutdown
Router(config-if)# cable rf-bandwidth-percent 30
Router(config-if)# exit
Router(config)# exit
Router# debug cable dbs
SLOT 5: Jan 8 05:01:53.074: DBS CLC: bw_sum_kbps:37500, mc_guar:4500
30%,bw_link_kbps:37500, wb_guar: wb0:5500 40%;
SLOT 5: Jan 8 05:01:53.074: RF channel 0: quantum IC: 4500
SLOT 5: Jan 8 05:01:53.074: quantum WB[0]: 5500
SLOT 5: Jan 8 05:01:53.074: quantum WB[1]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[2]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[3]: 0
```

```

SLOT 5: Jan 8 05:01:53.074: quantum WB[4]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[5]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[6]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[7]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[8]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[9]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[10]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[11]: 0
SLOT 5: Jan 8 05:01:53.074: Slot 5: add RF 0, cr7200_clc_dbs_rfchannel_bitmap 255,
policy_rate 4687, tokens 46870, dbs pct 100
SLOT 5: Jan 8 05:01:53.074: DBS CLC: bw_sum_kbps:37500, mc_guar:4500
30%,bw_link_kbps:37500, wb_guar: wb0:5500 40%;
SLOT 5: Jan 8 05:01:53.074: RF channel 0: quantum IC: 4500
SLOT 5: Jan 8 05:01:53.074: quantum WB[0]: 5500
SLOT 5: Jan 8 05:01:53.074: quantum WB[1]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[2]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[3]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[4]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[5]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[6]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[7]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[8]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[9]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[10]: 0
SLOT 5: Jan 8 05:01:53.074: quantum WB[11]: 0
SLOT 5: Jan 8 05:01:53.074: Slot 5: add RF 0, cr7200_clc_dbs_rfchannel_bitmap 255,
policy_rate 4687, tokens 46870, dbs pct 100

```

**Related Commands**

| Command                                    | Description                                                                                   |
|--------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>cable<br/>dynamic-bw-sharing</b>        | Enables dynamic bandwidth sharing on a specific integrated cable or wideband cable interface. |
| <b>show interface<br/>wideband-cable</b>   | Displays the current configuration and status for a wideband channel.                         |
| <b>show interface<br/>integrated-cable</b> | Displays the current configuration and status for an integrated channel.                      |

# debug cable dcc

To display information about DOCSIS 1.1 Dynamic Channel Change (DCC) messages, use the **debug cable dcc** command in Privileged EXEC mode. To disable debugging output for DCC messages, use the **no** form of this command.

```
debug cable dcc
no debug cable dcc
```

**Syntax Description**    This command has no arguments or keywords.

**Command Default**    No default behavior or values.

**Command Modes**    Privileged EXEC

| Command History | Release    | Modification                                          |
|-----------------|------------|-------------------------------------------------------|
|                 | 12.1(7)CX  | This command was introduced for DOCSIS 1.1 operation. |
|                 | 12.2(4)BC1 | Support was added to the Release 12.2 BC train.       |

**Usage Guidelines**    This command shows debugging messages about the DCC Request (DCC-REQ) message that the CMTS sends to the CM, and about the DCC Response (DCC-RSP) message that the CM sends in reply.



**Caution**

The debug commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic. In particular, avoid using the **debug cable dcc** command on an interface with a significant number of CMs, because the resulting volume of debug output could impact system performance. Cisco recommends that when you use the **debug cable dcc** command, you limit its output to a particular interface or CM, using the **debug cable interface** command.



**Tip**

To display the contents of the DCC messages, enable TLV debugging with the **debug cable tlvs** command.



**Note**

See the DOCSIS 1.1 specification (revision SP-RF1v1.1-I05-000714 and above) for information on the content and format of the DCC-REQ and DCC-RSP messages.

**Examples**

The following examples show typical output for the **debug cable dcc** command. The following example shows the debug output from a DCC-REQ message that instructs the CM to change its upstream channel to channel 1, using the default initialization technique (option 0, the CM is to reinitialize its MAC layer, requiring a complete reregistration):

```
Router# debug cable int c3/0
Router# debug cable dcc
CMTS DCC encodings debugging is on
Router#
00:02:57: Found DCC TLV
00:02:57: US Channel ID 1
00:02:57: received a DCC_RSP. upstream = 1.
```

The following example shows the debug output from a DCC-REQ message that instructs the CM to change its upstream channel to channel 1, using initialization technique 4 (the CM is to continue its normal operations after synchronizing to the new channel).

```
00:04:29: Found DCC TLV
00:04:29: US Channel ID 1
00:04:29: Found DCC TLV
00:04:29: Init Tech 4
00:04:29: received a DCC_RSP. upstream = 1.
00:04:29: CM new state = 15
00:04:30: DCC-RSP-NEW-TIMEOUT: CmMac->00ac.0000.0070 OrgId->32770
00:04:30: DCC-RSP-ARRIVE is lost.
00:04:30: received a DCC_RSP. upstream = 0.
00:04:30: ERROR: Received DCC-RSP-ARRIVE w/o DCC-REQ.
00:04:30: DCC-ACK Message Contents:
00:04:30: 0x0000: C2 00 00 1A 00 00 00 30 EB 15 2E 97 00 AC 00 00
00:04:30: 0x0010: 00 70 00 08 00 00 03 02 19 00 80 02
00:04:30: DCC-ACK-SENT: CM->0030.eb15.2e97 TranscId->32770
```

The following example shows the debug output from a DCC-REQ message that instructs the CM to change its upstream channel to channel 2, using initialization technique 4, and substituting a new service flow ID (SFID) of 160 for the current SFID of 14.

```
00:05:19: Found DCC TLV
00:05:19: US Channel ID 2
00:05:19: Found DCC TLV
00:05:19: Init Tech 4
00:05:19: Found DCC TLV
00:05:19: SFID Substitute old 14 new 160
00:05:19: received a DCC_RSP. upstream = 0.
00:05:19: CM new state = 15
00:05:20: DCC-RSP-NEW-TIMEOUT: CmMac->00ac.0000.0070 OrgId->32771
00:05:20: DCC-RSP-ARRIVE is lost.
00:05:20: received a DCC_RSP. upstream = 1.
00:05:20: ERROR: Received DCC-RSP-ARRIVE w/o DCC-REQ.
00:05:20: DCC-ACK Message Contents:
00:05:20: 0x0000: C2 00 00 1A 00 00 00 30 EB 15 2E 97 00 AC 00 00
00:05:20: 0x0010: 00 70 00 08 00 00 03 02 19 00 80 03
00:05:20: DCC-ACK-SENT: CM->0030.eb15.2e97 TranscId->32771
```

The following example shows the debug output from a DCC-REQ message that specifies an upstream channel with a frequency that is not a multiple of 62,500 Hz, which is required by the DOCSIS specification:

```
00:07:28: Found DCC TLV
00:07:28: US Channel ID 2
00:07:28: Found DCC TLV
00:07:28: Init Tech 4
00:07:28: Found DCC TLV
00:07:28: ERROR: DS frequency not a multiple of 62500Hz.
```

**debug cable dcc**

00:07:28: Not able to parse the TLVs.

|                         |                                                                                                                                                                                                                                                  |                         |                                                                                                                        |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Related Commands</b> | <table><tr><td><b>debug cable tlvs</b></td><td>Displays debugging messages about the TLV values used for service flow encodings, classifier encodings, and PHS rules.</td></tr></table> | <b>debug cable tlvs</b> | Displays debugging messages about the TLV values used for service flow encodings, classifier encodings, and PHS rules. |
| <b>debug cable tlvs</b> | Displays debugging messages about the TLV values used for service flow encodings, classifier encodings, and PHS rules.                                                                                                                           |                         |                                                                                                                        |

# debug cable dci

To display information about DOCSIS 1.1 Device Class Identification (DCI) messages, use the **debug cable dci** command in privileged EXEC mode. To disable debugging output for DCI messages, use the **no** form of this command.

**debug cable dci**

**no debug cable dci**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release    | Modification                                          |
|-----------------|------------|-------------------------------------------------------|
|                 | 12.1(4)CX  | This command was introduced for DOCSIS 1.1 operation. |
|                 | 12.2(4)BC1 | Support was added to the Release 12.2 BC train.       |

**Usage Guidelines** This command shows debugging messages about the DCI-REQ messages that the Cisco CMTS receives from CMs.



**Note**

See the DOCSIS 1.1 specification (revision SP-RF1v1.1-I05-000714 and above) for additional information on the DCI-REQ, DCI-RSP, and Upstream Transmitter Disable (UP-DIS) messages.

**Examples** The following example shows typical output displayed by the **debug cable dci** command:

```
Router# debug cable interface c3/0
Router# debug cable dci
CMTS dci debugging is on
Router#
DCI-REQ: CM->1234.5678.abcd SID->1
Device Class 1st half->0000000000000000 Device Class 2nd half->0000000000000001
```

| Related Commands | cable dci-response         | Configures how a cable interface responds to DCI-REQ messages coming from CMs on that interface.                                                        |
|------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | cable dci-upstream-disable | Configures the cable interface so that it sends an Upstream Transmitter Disable (UP-DIS) message in response to a DCI-REQ message from a particular CM. |

# debug cable dhcp

To enable debugging of the Dynamic Host Configuration Protocol (DHCP) when it is used on the cable interface, use the **debug cable dhcp** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cable dhcp**

**no debug cable dhcp**

**Syntax Description**    This command has no arguments or keywords.

**Command Modes**    Privileged EXEC

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(11)BC3 | This command was introduced. |

**Usage Guidelines**    The debug commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic. In particular, avoid using the **debug cable dhcp** command on an interface with a significant number of CMs, because the resulting volume of debug output could impact system performance. Cisco recommends that when you use the **debug cable dhcp** command, you limit its output to a particular interface or CM, using the **debug cable interface** or **debug cable mac-address** commands.

**Examples**    The following shows typical debugging messages for the **debug cable dhcp** command for a particular cable modem that is acquiring a DHCP address:

```
Router# debug cable dhcp
CMTS dhcp debugging is on

Router# debug cable mac-address 0020.4072.7418
Router# clear cable modem 0020.4072.7418 reset
Router#
DHCPINFO hwidb Cable3/1 MAC 0020.4072.7418 SID 2 dhcp_op 1
DHCPINFO wan info circuit 80010006 remote_system_id 0020.4072.7418 remote_device_class 0
DHCP cmts_helper_forward idb Cable3/1.1 client 0020.4072.7418 31.1.1.1
DHCPGLEAN input idb Cable3/1.1 MAC 0020.4072.7418 type 1
DHCPGLEAN hwidb Cable3/1 found for MAC 0020.4072.7418
DHCPGLEAN cmts glean hwidb Cable3/0 mac 0020.4072.7418 sid 2 ipaddr 0.0.0.0
DHCPGLEAN input idb Cable3/1.1 MAC 0020.4072.7418 type 2
DHCPGLEAN hwidb Cable3/1 found for MAC 0020.4072.7418
DHCPGLEAN SID 2 MAC 0020.4072.7418 on Cable3/0 mapped to swidb Cable3/1.1 ipaddr 31.0.0.2
DHCPINFO hwidb Cable3/1 MAC 0020.4072.7418 SID 2 dhcp_op 1
DHCPINFO wan info circuit 80010006 remote_system_id 0020.4072.7418 remote_device_class 0
DHCP cmts_helper_forward idb Cable3/1.1 client 0020.4072.7418 31.1.1.1 Host
DHCPGLEAN input idb Cable3/1.1 MAC 0020.4072.7418 type 3
DHCPGLEAN hwidb Cable3/1 found for MAC 0020.4072.7418
DHCPGLEAN cmts glean hwidb Cable3/0 mac 0020.4072.7418 sid 2 ipaddr 0.0.0.0
DHCPGLEAN input idb Cable3/1.1 MAC 0020.4072.7418 type 5
```



```
DHCPGLEAN hwi db Cable3/1 found for MAC 0020.4072.7418
DHCPGLEAN cmts glean hwi db Cable3/0 mac 0020.4072.7418 sid 0 ipaddr 31.0.0.2
DHCPGLEAN SID 2 MAC 0020.4072.7418 on Cable3/0 mapped to swi db Cable3/1.1 ipaddr 31.0.0.2
```

**Related Commands**

| Command                        | Description                                                                                    |
|--------------------------------|------------------------------------------------------------------------------------------------|
| <b>debug cable arp</b>         | Enables debugging of the Address Resolution Protocol on the cable interface.                   |
| <b>debug cable encap</b>       | Enables debugging of encapsulated PPPoE packets that are transmitted over the cable interface. |
| <b>debug cable interface</b>   | Enables debugging on a specific cable interface.                                               |
| <b>debug cable mac-address</b> | Enables debugging for a particular CM.                                                         |

# debug cable dsg

To enable general, downstream channel descriptor (DCD), or packet-related debugging for Advanced-Mode DOCSIS Set-Top Gateway (A-DSG) on a Cisco CMTS router, use the **debug cable dsg** command in privileged EXEC mode. To disable A-DSG debugging, use the **no** form of this command.

**debug cable dsg** [**dcd** | **pkt** | **name**]

**no debug cable dsg**

## Syntax Description

|             |                                                                                |
|-------------|--------------------------------------------------------------------------------|
| <b>dcd</b>  | (Optional) Enables DCD-related debugging. Can be combined with <b>pkt</b> .    |
| <b>pkt</b>  | (Optional) Enables packet-related debugging. Can be combined with <b>dcd</b> . |
| <b>name</b> | (Optional) Enables DSG host name-related debugging.                            |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                 |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced for the Cisco uBR7100 series and Cisco uBR7246VXR routers.                                                                                       |
| 12.3(9a)BC  | This command was introduced for the Cisco uBR10012 router.                                                                                                                   |
| 12.3(13a)BC | This command was modified to begin support of A-DSG on the Cisco uBR10012 router and Cisco uBR7200 series routers. The <b>dcd</b> and <b>pkt</b> keyword options were added. |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                           |
| 12.2(33)SCG | This command was modified. A new keyword, <b>name</b> , was added to enable DSG name-related debugging.                                                                      |

## Usage Guidelines

Debug commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic because the resulting volume of debug output could impact system performance. Because this command can produce a large volume of information, use this command only when you have also enabled debugging for a particular interface or MAC address, using the **debug cable interface** and **debug cable mac-address** commands, respectively.

When using the **debug cable dsg** command with the **dcd** keyword, it shows DCD counters. If the configuration is changed, the whole DCD message content is displayed, including the MAC header.

## Related Commands

| Command                                    | Description                                                                                           |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>show cable dsg tunnel</b>               | Displays information about A-DSG tunnel configuration on a Cisco CMTS router.                         |
| <b>show interface</b>                      | Displays general interface information for the specified or all interfaces.                           |
| <b>show interface cable dsg downstream</b> | Displays interface configuration and status information for A-DSG downstreams on a Cisco CMTS router. |

# debug cable dynamic-qos subscriber

To enable debugging of the call trace functionality on the Cisco CMTS router for a particular subscriber, use the **debug cable dynamic-qos subscriber** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

**debug cable dynamic-qos subscriber** [ipv4-address [mask-address] | ipv6-address] [verbose]

**no debug cable dynamic-qos subscriber** [ipv4-address [mask-address] | ipv6-address] [verbose]

## Syntax Description

|                     |                                                                                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ipv4-address</i> | (Optional) IPv4 address of the subscriber.                                                                                               |
| <i>mask-address</i> | (Optional) IPv4 mask for the specified IPv4 address. If you do not specify the mask address, the default mask (255.255.255.255) is used. |
| <i>ipv6-address</i> | (Optional) IPv6 address of the subscriber.                                                                                               |
| <b>verbose</b>      | (Optional) Provides detailed debugging information with the verbose output.                                                              |

## Command Default

Debugging is not enabled for any of the subscribers.

## Command Modes

Privileged EXEC (#)

## Command History

| Release                       | Modification                 |
|-------------------------------|------------------------------|
| Cisco IOS Release 12.2(33)SCF | This command was introduced. |

## Usage Guidelines

The **debug cable dynamic-qos subscriber** command enables debugging for a particular subscriber. For the debugs to get printed, you must enable call trace debugging using the **debug cable dynamic-qos trace** command.

The following two debug commands enable most of the subscriber-based debug logs relevant to PacketCable, PacketCable Multimedia (PCMM), and dynamic quality of service (DQoS) lite subscriber debugging:

- **debug cable dynamic-qos trace**
- **debug cable dynamic-qos subscriber**

## Examples

The following example shows debugging information for all the configured subscribers on the Cisco uBR10012 router in Cisco IOS Release 12.2(33)SCF:

```
Router# debug cable dynamic-qos subscriber

CMTS dyngos subscriber debugging is on ubr10k#
*Mar 17 08:32:27.135: Pktcbl(gdb): Created gate IE on Cable7/1/0, gateid = 10804
2
*Mar 17 08:32:27.135: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:27.135: Pktcbl(mm): Change profile 0 qos 0
```

```

*Mar 17 08:32:27.135: Pktcbl(gdb): IPC timer [id 108042] [10000 msec]
*Mar 17 08:32:27.135: Pktcbl(gdb): Started gate [id 108042] timer [type 8] [1000
0 msec]
*Mar 17 08:32:27.135: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:27.135: Pktcbl(gdb): MM gate spec: t1:200, t2:0, t3:0, t4:0
*Mar 17 08:32:27.135: Pktcbl(gdb): MM traffic profile type: 6
*Mar 17 08:32:27.135: Pktcbl(gdb): MM Authorized Profile
*Mar 17 08:32:27.135: Pktcbl(gdb): MM Reserved Profile
*Mar 17 08:32:27.135: Pktcbl(gdb): MM Committed Profile
*Mar 17 08:32:27.135: Classifier prototype: 1, src: 9.9.1.95, dest: 2.39.26.11,
src port: 0, dest port: 0
*Mar 17 08:32:27.179: Pktcbl(mm): Received gate-set IPC RSP from LC for gate 108
042 rsp 1 state new(4) old(2)
*Mar 17 08:32:27.179: Pktcbl(gdb): Cancelled gate [id 108042] timer [type 8]
*Mar 17 08:32:27.179: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:27.179: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:27.179: Pktcbl(gdb): Started gate [id 108042] timer [type 3] [0 ms
ec]
*Mar 17 08:32:27.179: PktCbl(d2r): extract id: gate=108042, resource=74
*Mar 17 08:32:27.179: PktCbl(d2r): extract id: gate=108042, resource=74
*Mar 17 08:32:27.179: Pktcbl(gdb): TOS Overwrite gate spec info,gate_id=108042 d
ir=1 gie=26DD5C98
*Mar 17 08:32:27.179: Pktcbl(gdb): TOS Overwrite Gate=108042 DSCP=0xD0 mask=0xF
*Mar 17 08:32:27.179: PktCbl(d2r): extract id: gate=108042, resource=74
*Mar 17 08:32:27.179: PktCbl(mm-r2d): DSA-ACK notification received on RP, gatei
d 108042 sfid 74
*Mar 17 08:32:27.179: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:27.183: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:27.183: Pktcbl(mm): Building GCP message, added obj TRANSACTION
ubr10k# ID ; len:8 padding:0
*Mar 17 08:32:27.183: Pktcbl(mm): Building GCP message, added obj AM ID
; len:8 padding:0
*Mar 17 08:32:27.183: Pktcbl(mm): Building GCP message, added obj SUBSCRIBER ID
; len:8 padding:0
*Mar 17 08:32:27.183: Pktcbl(mm): Building GCP message, added obj GATE ID
; len:8 padding:0
*Mar 17 08:32:27.183: Pktcbl(mm): Building GCP message, added obj OPAQUE
; len:12 padding:0
*Mar 17 08:32:27.183: Pktcbl(mm): Built GCP message, GATE SET ACK , lengt
h: 44, copsLen 72
*Mar 17 08:32:27.183: --- Pktcbl: Sending GCP message -----
*Mar 17 08:32:27.183: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 08:32:27.183: transaction id : 0x1
*Mar 17 08:32:27.183: gcp cmd : 5 (GATE SET ACK)
*Mar 17 08:32:27.183: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 08:32:27.183: AM ID : 0x1 (0/1)
*Ma
ubr10k#r 17 08:32:27.183: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 08:32:27.183: Addr : 21.21.2.10
*Mar 17 08:32:27.183: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 08:32:27.183: GateID : 108042 (0x1A60A)
*Mar 17 08:32:27.183: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 08:32:27.183: data : [31 32 33 34 00 00 00 00]
*Mar 17 08:32:27.183: -----
SLOT 7/1: Mar 17 08:32:27.152: Pktcbl(gdb): Gate ID 108042 not found in gdb, pkt
cbl_find_gate_ie.
SLOT 5/0: Mar 17 08:32:27.151: Pktcbl(gdb): Gate ID 108042 not found in gdb, pkt
cbl_find_gate_ie.
ubr10k#
*Mar 17 08:32:56.656: Pktcbl(mm): Received GATE SET message, tid=0x2
*Mar 17 08:32:56.656: --- Pktcbl(mm): Received GCP message -----
*Mar 17 08:32:56.656: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 08:32:56.656: transaction id : 0x2
*Mar 17 08:32:56.656: gcp cmd : 4 (GATE SET)

```

```

*Mar 17 08:32:56.656: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 08:32:56.656: AM ID : 0x1 (0/1)
*Mar 17 08:32:56.656: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 08:32:56.656: Addr : 21.21.2.10
*Mar 17 08:32:56.656: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 08:32:56.656: GateID : 108042 (0x1A60A)
*Mar 17 08:32:56.656: GATE SPEC : Object.[snum/stype/len 5/1/16]
*Mar 17 08:32:56.656: flag : 0x3
*Mar 17 08:32:56.656: dscp : 0xD8
*Mar 17 08:32:56.656: dscp tos mask : 0xF0
*Mar 17 08:32:56.656: Timers t1 : 0, t2 : 0
*Mar 17 08:32:56.656: t3 : 0, t4 : 0
*Mar 17 08:32:56.656: session class : 0x0
*Mar 17 08:32:56.656: TRAFFIC PROFILE : Object.[snum/stype/len 7/6/56]
*Mar 17 08:32:56.656: envelope : 0x7
*Mar 17 08:32:56.656: service number : 0x0
*Mar 17 08:32:56.656: Authorized :
*Mar 17 08:32:56.656: Request Xmit Policy: 0x17F
*Mar 17 08:32:56.656: Grant size : 232
*Mar 17 08:32:56.656: Grant Per Interval : 2
*Mar 17 08:32:56.656: Grant Interval : 20000
*Mar 17 08:32:56.656: Tolerated Jitter : 800
*Mar 17 08:32:56.656: Required Mask : 0
*Mar 17 08:32:56.656: Forbidden Mask : 0
*Mar 17 08:32:56.656: Aggr Rule Mask : 0
*Mar 17 08:32:56.656: Reserved :
*Mar 17 08:32:56.656: Request Xmit Policy: 0x17F
*Mar 17 08:32:56.656: Grant size : 232
*Mar 17 08:32:56.656: Grant Per Interval : 2
*Mar 17 08:32:56.656: Grant Interval : 20000
*Mar 17 08:32:56.656: Tolerated Jitter : 800
*Mar 17 08:32:56.656: Required Mask : 0
*
ubr10k#Mar 17 08:32:56.656: Forbidden Mask : 0
*Mar 17 08:32:56.656: Aggr Rule Mask : 0
*Mar 17 08:32:56.656: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 08:32:56.656: protocol : 1
*Mar 17 08:32:56.656: dscp : 0x0
*Mar 17 08:32:56.656: dscp tos mask : 0x0
*Mar 17 08:32:56.656: src/port : 9.9.1.95 0
*Mar 17 08:32:56.656: dest/port : 2.39.26.11 0
*Mar 17 08:32:56.656: priority : 64
*Mar 17 08:32:56.656: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 08:32:56.656: protocol : 1
*Mar 17 08:32:56.656: dscp : 0x0
*Mar 17 08:32:56.656: dscp tos mask : 0x0
*Mar 17 08:32:56.656: src/port : 9.9.1.43 0
*Mar 17 08:32:56.656: dest/port : 2.39.26.19 0
*Mar 17 08:32:56.656: priority : 64
*Mar 17 08:32:56.656: OPAQUE : Object.[snum/stype/
ubr10k#len 11/1/12]
*Mar 17 08:32:56.656: data : [31 32 33 34 00 00 00 00]
*Mar 17 08:32:56.656: -----
*Mar 17 08:32:56.656: Backup gate IE [108042]
*Mar 17 08:32:56.656: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:56.656: Pktcbl(mm): Change profile 1 qos 1
*Mar 17 08:32:56.656: Pktcbl(gdb): IPC timer [id 108042] [10000 msec]
*Mar 17 08:32:56.656: Pktcbl(gdb): Started gate [id 108042] timer [type 8] [1000
0 msec]
*Mar 17 08:32:56.656: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:56.656: Pktcbl(gdb): MM gate spec: t1:200, t2:0, t3:0, t4:0
*Mar 17 08:32:56.656: Pktcbl(gdb): MM traffic profile type: 6
*Mar 17 08:32:56.656: Pktcbl(gdb): MM Authorized Profile
*Mar 17 08:32:56.660: Pktcbl(gdb): MM Reserved Profile

```

```

*Mar 17 08:32:56.660: Pktcbl(gdb): MM Committed Profile
*Mar 17 08:32:56.660: Classifier prototype: 1, src: 9.9.1.95, dest: 2.39.26.11,
src port: 0, dest port: 0
*Mar 17 08:32:56.660: Classifier prototype: 1, src: 9.9.1.43, dest: 2.39.26.19,
src port: 0, dest port: 0
*Mar 17 08:32:56.696: Pktcbl(mm): Received gate-set IPC RSP from LC for gate 108
042 rsp 1 state new(4) old(4)
*Mar 17 08:32:56.696: Pktcbl(gdb): Cancelled gate [id 108042] timer [type 8]
*Mar 17 08:32:56.696: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:56.696: Pktcbl(gdb): Started gate [id 108042] timer [type 3] [0 ms
ec]
*Mar 17 08:32:56.696: Pktcbl(gdb): Cleanup saved gate IE info, gate(108042)
*Mar 17 08:32:56.696: PktCbl(d2r): extract id: gate=108042, resource=74
*Mar 17 08:32:56.696: Pktcbl(gdb): TOS Overwrite gate spec info,gate_id=108042 d
ir=1 gie=26DD5C98
*Mar 17 08:32:56.696: Pktcbl(gdb): TOS Overwrite Gate=108042 DSCP=0xD0 mask=0xF
*Mar 17 08:32:56.696: PktCbl(d2r): extract id: gate=108042, resource=74
*Mar 17 08:32:56.696: PktCbl(mm-r2d): DSA-ACK notification received on RP, gatei
d 108042 sfid 74
*Mar 17 08:32:56.696: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:56.696: Pktcbl(gdb): Found Cable7/1/0 for Gate=108042 21.21.2.10
*Mar 17 08:32:56.696: Pktcbl(mm): Building GCP message, added obj TRANSACTION ID
; len:8 padding:0
*Mar 17 08:32:56.696: Pktcbl(mm): Building GCP message, added obj AM ID
; len:8 padding:0
*Mar 17 08:32:56.696: Pktcbl(mm): Building GCP message, added obj SUBSCRIBER ID
; len:8 padding:0
*Mar 17 08:32:56.696: Pktcbl(mm): Building GCP message, added obj GATE ID
; len:8 padding:0
*Mar 17 08:32:56.696: Pktcbl(mm): Building GCP message, added obj OPAQUE
; len:12 padding:0
*Mar 17 08:32:56.696: Pktcbl(mm): Built GCP message, GATE SET ACK , lengt
h: 44, copsLen 72
*Mar 17 08:32:56.696: --- Pktcbl: Sending GCP message -----
*Mar 17 08:32:56.696: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 08:32:56.696: transaction id : 0x2
*Mar 17 08:32:56.696: gcp cmd : 5 (GATE SET ACK)
*Mar 17 08:32:56.696: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 08:32:56.696: AM ID : 0x1 (0/1)
*Mar 17 08:32:56.696: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 08:32:56.696: Addr : 21.21.2.10
*Mar 17 08:32:56.696: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 08:32:56.696: GateID : 108042 (0x1A60A)
*Mar 17 08:32:56.696: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 08:32:56.696: data : [31 32 33 34 00 00 00 00]
*Mar 17 08:32:56.696: -----

```

The following example shows debugging information based on the subscriber IP address on the Cisco uBR10012 router in Cisco IOS Release 12.2(33)SCF:

Router# **debug cable dynamic-qos subscriber 21.21.2.10**

CMTS dynqos subscriber debugging is on

```

*Mar 17 02:29:13.293: Pktcbl(gdb): Created new Subscriber IE for 21.21.2.10
*Mar 17 02:29:13.293: Pktcbl(gdb): Updated subscriber IE [subs addr: 21.21.2.10,
gate: 26118]
*Mar 17 02:29:13.297: Pktcbl(gdb): Created gate IE on Cable7/1/0, gateid = 26118
*Mar 17 02:29:13.297: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*Mar 17 02:29:13.297: Pktcbl(mm): Change profile 0 qos 0
*Mar 17 02:29:13.297: Pktcbl(gdb): IPC timer [id 26118] [10000 msec]
*Mar 17 02:29:13.297: Pktcbl(gdb): Started gate [id 26118] timer [type 8] [10000
msec]

```

```

*Mar 17 02:29:13.297: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*Mar 17 02:29:13.297: Pktcbl(gdb): MM gate spec: t1:200, t2:0, t3:0, t4:0
*Mar 17 02:29:13.297: Pktcbl(gdb): MM traffic profile type: 6
*Mar 17 02:29:13.297: Pktcbl(gdb): MM Authorized Profile
*Mar 17 02:29:13.297: Pktcbl(gdb): MM Reserved Profile
*Mar 17 02:29:13.297: Pktcbl(gdb): MM Committed Profile
*Mar 17 02:29:13.297: Classifier prototype: 1, src: 9.9.1.95, dest: 2.39.26.11,
src port: 0, dest port: 0
*Mar 17 02:29:13.333: Pktcbl(mm): Received gate-set IPC RSP from LC for gate 261
18 rsp 1 state new(4) old(2)
*Mar 17 02:29:13.333: Pktcbl(gdb): Cancelled gate [id 26118] timer [type 8]
*Mar 17 02:29:13.333: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*Mar 17 02:29:13.333: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*Mar 17 02:29:13.333: Pktcbl(gdb): Started gate [id 26118] timer [type 3] [0 mse
c]
*Mar 17 02:29:13.333: PktCbl(d2r): extract id: gate=26118, resource=62
*Mar 17 02:29:13.333: PktCbl(d2r): extract id: gate=26118, resource=62
*Mar 17 02:29:13.333: Pktcbl(gdb): TOS Overwrite gate spec info,gate_id=26118 di
r=1 gie=2A8EA2D0
*Mar 17 02:29:13.333: Pktcbl(gdb): TOS Overwrite Gate=26118 DSCP=0xD0 mask=0xF
*Mar 17 02:29:13.337: PktCbl(d2r): extract id: gate=26118, resource=62
*Mar 17 02:29:13.337: PktCbl(mm-r2d): DSA-ACK notification received on RP, gatei
d 26118 sfid 62
*Mar 17 02:29:13.337: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*M
ubr10k#ar 17 02:29:13.337: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.
10
*Mar 17 02:29:13.337: Pktcbl(mm): Building GCP message, added obj TRANSACTION ID
; len:8 padding:0
*Mar 17 02:29:13.337: Pktcbl(mm): Building GCP message, added obj AM ID
; len:8 padding:0
*Mar 17 02:29:13.337: Pktcbl(mm): Building GCP message, added obj SUBSCRIBER ID
; len:8 padding:0
*Mar 17 02:29:13.337: Pktcbl(mm): Building GCP message, added obj GATE ID
; len:8 padding:0
*Mar 17 02:29:13.337: Pktcbl(mm): Building GCP message, added obj OPAQUE
; len:12 padding:0
*Mar 17 02:29:13.337: Pktcbl(mm): Built GCP message, GATE SET ACK , lengt
h: 44, copsLen 72
*Mar 17 02:29:13.337: --- Pktcbl: Sending GCP message -----
*Mar 17 02:29:13.337: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:29:13.337: transaction id : 0x3
*Mar 17 02:29:13.337: gcp cmd :
ubr10k# 5 (GATE SET ACK)
*Mar 17 02:29:13.337: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:29:13.337: AM ID : 0x1 (0/1)
*Mar 17 02:29:13.337: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:29:13.337: Addr : 21.21.2.10
*Mar 17 02:29:13.337: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:29:13.337: GateID : 26118 (0x6606)
*Mar 17 02:29:13.337: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 02:29:13.337: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:29:13.337: -----
SLOT 7/1: Mar 17 02:29:13.307: Pktcbl(gdb): Gate ID 26118 not found in gdb, pktc
bl_find_gate_ie.
SLOT 5/0: Mar 17 02:29:13.307: Pktcbl(gdb): Gate ID 26118 not found in gdb, pktc
bl_find_gate_ie.
ubr10k#
*Mar 17 02:29:50.547: Pktcbl(mm): Received GATE SET message, tid=0x4
*Mar 17 02:29:50.547: --- Pktcbl(mm): Received GCP message -----
*Mar 17 02:29:50.547: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:29:50.547: transaction id : 0x4
*Mar 17 02:29:50.547: gcp cmd : 4 (GATE SET)
*Mar 17 02:29:50.547: AM ID : Object.[snum/stype/len 2/1/8]

```

## debug cable dynamic-qos subscriber

```

*Mar 17 02:29:50.547: AM ID : 0x1 (0/1)
*Mar 17 02:29:50.547: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:29:50.547: Addr : 21.21.2.10
*Mar 17 02:29:50.547: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:29:50.547: GateID : 26118 (0x6606)
*Mar 17 02:29:50.547: GATE SPEC : Object.[snum/stype/len 5/1/16]
*Mar 17 02:29:50.547: flag : 0x3
*Mar 17 02:29:50.547: dscp : 0xD8
*Mar 17 02:29:50.547: dscp tos mask : 0xF0
*Mar 17 02:29:50.547: Timers t1 : 0, t2 : 0
*Mar 17 02:29:50.547: t3 : 0, t4 : 0
*Mar 17 02:29:50.547: session class : 0x0
*Mar 17 02:29:50.547: TRAFFIC PROFILE : Object.[snum/stype/len 7/6/56]
*Mar 17 02:29:50.547: envelope : 0x7
*Mar 17 02:29:50.547: service number : 0x0
*Mar 17 02:29:50.547: Authorized :
*Mar 17 02:29:50.547: Request Xmit Policy: 0x17F
*Mar 17 02:29:50.547: Grant size : 232
*Mar 17 02:29:50.547: Grant Per Interval : 2
*Mar 17 02:29:50.547: Grant Interval : 20000
*Mar 17 02:29:50.547: Tolerated Jitter : 800
*Mar 17 02:29:50.547: Required Mask : 0
*Mar 17 02:29:50.547: Forbidden Mask : 0
*Mar 17 02:29:50.547: Aggr Rule Mask : 0
*Mar 17 02:29:50.547: Reserved :
*Mar 17 02:29:50.547: Request Xmit Policy: 0x17F
*Mar 17 02:29:50.547: Grant size : 232
*Mar 17 02:29:50.547: Grant Per Interval : 2
*Mar 17 02:29:50.547: Grant Interval : 20000
*Mar 17 02:29:50.547: Tolerated Jitter : 800
*Mar 17 02:29:50.547: Required Mask : 0
*Ma
ubr10k#r 17 02:29:50.547: Forbidden Mask : 0
*Mar 17 02:29:50.547: Aggr Rule Mask : 0
*Mar 17 02:29:50.547: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 02:29:50.547: protocol : 1
*Mar 17 02:29:50.547: dscp : 0x0
*Mar 17 02:29:50.547: dscp tos mask : 0x0
*Mar 17 02:29:50.551: src/port : 9.9.1.95 0
*Mar 17 02:29:50.551: dest/port : 2.39.26.11 0
*Mar 17 02:29:50.551: priority : 64
*Mar 17 02:29:50.551: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 02:29:50.551: protocol : 1
*Mar 17 02:29:50.551: dscp : 0x0
*Mar 17 02:29:50.551: dscp tos mask : 0x0
*Mar 17 02:29:50.551: src/port : 9.9.1.43 0
*Mar 17 02:29:50.551: dest/port : 2.39.26.19 0
*Mar 17 02:29:50.551: priority : 64
*Mar 17 02:29:50.551: OPAQUE : Object.[snum/stype/le
ubr10k#n 11/1/12]
*Mar 17 02:29:50.551: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:29:50.551: -----
*Mar 17 02:29:50.551: Backup gate IE [26118]
*Mar 17 02:29:50.551: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*Mar 17 02:29:50.551: Pktcbl(mm): Change profile 1 qos 1
*Mar 17 02:29:50.551: Pktcbl(gdb): IPC timer [id 26118] [10000 msec]
*Mar 17 02:29:50.551: Pktcbl(gdb): Started gate [id 26118] timer [type 8] [10000
msec]
*Mar 17 02:29:50.551: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*Mar 17 02:29:50.551: Pktcbl(gdb): MM gate spec: t1:200, t2:0, t3:0, t4:0
*Mar 17 02:29:50.551: Pktcbl(gdb): MM traffic profile type: 6
*Mar 17 02:29:50.551: Pktcbl(gdb): MM Authorized Profile
*Mar 17 02:29:50.551: Pktcbl(gdb): MM Reserved Profile
*Mar 17 02:29:50.551: Pktcbl(gdb): MM Committed Profile

```



```

*Mar 17 02:29:50.551: Classifier prototype: 1, src: 9.9.1.95, dest: 2.39.26.11,
src port: 0, dest port: 0
*Mar 17 02:29:50.551: Classifier prototype: 1, src: 9.9.1.43, dest: 2.39.26.19,
src port: 0, dest port: 0
*Mar 17 02:29:50.583: Pktcbl(mm): Received gate-set IPC RSP from LC for gate 261
18 rsp 1 state new(4) old(4)
*Mar 17 02:29:50.583: Pktcbl(gdb): Cancelled gate [id 26118] timer [type 8]
*Mar 17 02:29:50.583: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*Mar 17 02:29:50.583: Pktcbl(gdb): Started gate [id 26118] timer [type 3] [0 mse
c]
*Mar 17 02:29:50.583: Pktcbl(gdb): Cleanup saved gate IE info, gate(26118)
*Mar 17 02:29:50.583: PktCbl(d2r): extract id: gate=26118, resource=62
*Mar 17 02:29:50.583: Pktcbl(gdb): TOS Overwrite gate spec info,gate_id=26118 di
r=1 gie=2A8EA2D0
*Mar 17 02:29:50.583: Pktcbl(gdb): TOS Overwrite Gate=26118 DSCP=0xD0 mask=0xF
*Mar 17 02:29:50.583: PktCbl(d2r): extract id: gate=26118, resource=62
*Mar 17 02:29:50.583: PktCbl(mm-r2d): DSA-ACK notification received on RP, gatei
d 26118 sfid 62
*Mar 17 02:29:50.583: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*Mar 17 02:29:50.587: Pktcbl(gdb): Found Cable7/1/0 for Gate=26118 21.21.2.10
*Mar 17 02:29:50.587: Pktcbl(mm): Building GCP message, added obj TRANSACTION ID
; len:8 padding:0
*Mar 17 02:29:50.587: Pktcbl(mm): Building GCP message, added obj AM ID
; len:8 padding:0
*Mar 17 02:29:50.587: Pktcbl(mm): Building GCP message, added obj SUBSCRIBER ID
; len:8 padding:0
*Mar 17 02:29:50.587: Pktcbl(mm): Building GCP message, added obj GATE ID
; len:8 padding:0
*Mar 17 02:29:50.587: Pktcbl(mm): Building GCP message, added obj OPAQUE
; len:12 padding:0
*Mar 17 02:29:50.587: Pktcbl(mm): Built GCP message, GATE SET ACK , lengt
h: 44, copsLen 72
*Mar 17 02:29:50.587: --- Pktcbl: Sending GCP message -----
*Mar 17 02:29:50.587: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:29:50.587: transaction id : 0x4
*Mar 17 02:29:50.587: gcp cmd : 5 (GATE SET ACK)
*Mar 17 02:29:50.587: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:29:50.587: AM ID : 0x1 (0/1)
*Mar 17 02:29:50.587: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:29:50.587: Addr : 21.21.2.10
*Mar 17 02:29:50.587: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:29:50.587: GateID : 26118 (0x6606)
*Mar 17 02:29:50.587: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 02:29:50.587: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:29:50.587: -----

```

The following example shows debugging information based on the subscriber IP address when using the **debug cable dynamic-qos subscriber** command with the **verbose** keyword on the Cisco uBR10012 router in Cisco IOS Release 12.2(33)SCF:

```
Router# debug cable dynamic-qos subscriber 21.21.2.10 verbose
```

```
CMTS dynqos subscriber verbose debugging is on ubr10k#
```

```

*Mar 17 02:31:52.633: Pktcbl(mm): Received GATE SET message, tid=0x5
*Mar 17 02:31:52.633: --- Pktcbl(mm): Received GCP message -----
*Mar 17 02:31:52.633: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:31:52.633: transaction id : 0x5
*Mar 17 02:31:52.633: gcp cmd : 4 (GATE SET)
*Mar 17 02:31:52.633: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:31:52.633: AM ID : 0x1 (0/1)
*Mar 17 02:31:52.633: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]

```

## debug cable dynamic-qos subscriber

```

*Mar 17 02:31:52.633: Addr : 21.21.2.10
*Mar 17 02:31:52.633: GATE SPEC : Object.[snum/stype/len 5/1/16]
*Mar 17 02:31:52.633: flag : 0x3
*Mar 17 02:31:52.633: dscp : 0xD8
*Mar 17 02:31:52.633: dscp tos mask : 0xF0
*Mar 17 02:31:52.633: Timers t1 : 0, t2 : 0
*Mar 17 02:31:52.633: t3 : 0, t4 : 0
*Mar 17 02:31:52.633: session class : 0x0
*Mar 17 02:31:52.633: TRAFFIC PROFILE : Object.[snum/stype/len 7/6/56]
*Mar 17 02:31:52.633: envelope : 0x7
*Mar 17 02:31:52.633: service number : 0x0
*Mar 17 02:31:52.633: Authorized :
*Mar 17 02:31:52.633: Request Xmit Policy: 0x17F
*Mar 17 02:31:52.633: Grant size : 232
*Mar 17 02:31:52.633: Grant Per Interval : 1
*Mar 17 02:31:52.633: Grant Interval : 20000
*Mar 17 02:31:52.633: Tolerated Jitter : 800
*Mar 17 02:31:52.633: Required Mask : 0
*Mar 17 02:31:52.633: Forbidden Mask : 0
*Mar 17 02:31:52.633: Aggr Rule Mask : 0
*Mar 17 02:31:52.633: Reserved :
*Mar 17 02:31:52.633: Request Xmit Policy: 0x17F
*Mar 17 02:31:52.633: Grant size : 232
*Mar 17 02:31:52.633: Grant Per Interval : 1
*Mar 17 02:31:52.633: Grant Interval : 20000
*Mar 17 02:31:52.633: Tolerated Jitter : 800
*Mar 17 02:31:52.633: Required Mask : 0
*Mar 17 02:31:52.633: Forbidden Mask : 0
*Mar 17 02:31:52.633: Aggr Rule Mask : 0
*Mar 17 02:31:52.633: CLASSIFIER : Obj
ubr10k#ect.[snum/stype/len 6/1/24]
*Mar 17 02:31:52.633: protocol : 1
*Mar 17 02:31:52.633: dscp : 0x0
*Mar 17 02:31:52.633: dscp tos mask : 0x0
*Mar 17 02:31:52.633: src/port : 9.9.1.95 0
*Mar 17 02:31:52.637: dest/port : 2.39.26.11 0
*Mar 17 02:31:52.637: priority : 64
*Mar 17 02:31:52.637: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 02:31:52.637: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:31:52.637: -----
*Mar 17 02:31:52.637: Pktcbl(gdb): Allocating gate entry 0/2. Instance cnt: 1, g
ate_count is now 3
*Mar 17 02:31:52.637: Pktcbl(gdb): Updated subscriber IE [subs addr: 21.21.2.10,
gate: 42502]
*Mar 17 02:31:52.637: Pktcbl(gdb): Created gate IE on Cable7/1/0, gateid = 42502
*Mar 17 02:31:52.637: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:31:52.637: Pktcbl(mm)
ubr10k#: Change profile 0 qos 0
*Mar 17 02:31:52.637: Pktcbl(gdb): IPC timer [id 42502] [10000 msec]
*Mar 17 02:31:52.637: Pktcbl(gdb): Started gate [id 42502] timer [type 8] [10000
msec]
*Mar 17 02:31:52.637: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:31:52.637: Pktcbl(gdb): MM gate spec: t1:200, t2:0, t3:0, t4:0
*Mar 17 02:31:52.637: Pktcbl(gdb): MM traffic profile type: 6
*Mar 17 02:31:52.637: Pktcbl(gdb): MM Authorized Profile
*Mar 17 02:31:52.637: Pktcbl(gdb): MM Reserved Profile
*Mar 17 02:31:52.637: Pktcbl(gdb): MM Committed Profile
*Mar 17 02:31:52.637: Classifier prototype: 1, src: 9.9.1.95, dest: 2.39.26.11,
src port: 0, dest port: 0
*Mar 17 02:31:52.669: Pktcbl(mm): Received gate-set IPC RSP from LC for gate 425
02 rsp 1 state new(4) old(2)
*Mar 17 02:31:52.669: Pktcbl(gdb): Cancelled gate [id 42502] timer [type 8]
*Mar 17 02:31:52.669: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:31:52.669: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10

```

```

*Mar 17 02:31:52.669: Pktcbl(gdb): Started gate [id 42502] timer [type 3] [0 msec]
*Mar 17 02:31:52.669: PktCbl(d2r): extract id: gate=42502, resource=63
*Mar 17 02:31:52.669: PktCbl(d2r): extract id: gate=42502, resource=63
*Mar 17 02:31:52.669: Pktcbl(gdb): TOS Overwrite gate spec info,gate_id=42502 dir=1 gie=265BD720
*Mar 17 02:31:52.669: Pktcbl(gdb): TOS Overwrite Gate=42502 DSCP=0xD0 mask=0xF
*Mar 17 02:31:52.673: PktCbl(d2r): extract id: gate=42502, resource=63
*Mar 17 02:31:52.673: PktCbl(mm-r2d): DSA-ACK notification received on RP, gate id 42502 sfid 63
*Mar 17 02:31:52.673: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:31:52.673: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:31:52.673: Pktcbl(mm): Building GCP message, added obj TRANSACTION ID
; len:8 padding:0
*Mar 17 02:31:52.673: Pktcbl(mm): Building GCP message, added obj AM ID
; len:8 padding:0
*Mar 17 02:31:52.673: Pktcbl(mm): Building GCP message, added obj SUBSCRIBER ID
; len:8 padding:0
*Mar 17 02:31:52.673: Pktcbl(mm): Building GCP message, added obj GATE ID
; len:8 padding:0
*Mar 17 02:31:52.673: Pktcbl(mm): Building GCP message, added obj OPAQUE
; len:12 padding:0
*Mar 17 02:31:52.673: Pktcbl(mm): Built GCP message, GATE SET ACK , length: 44, copsLen 72
*Mar 17 02:31:52.673: --- Pktcbl: Sending GCP message -----
*Mar 17 02:31:52.673: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:31:52.673: transaction id : 0x5
*Mar 17 02:31:52.673: gcp cmd : 5 (GATE SET ACK)
*Mar 17 02:31:52.673: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:31:52.673: AM ID : 0x1 (0/1)
*Mar 17 02:31:52.673: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:31:52.673: Addr : 21.21.2.10
*Mar 17 02:31:52.673: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:31:52.673: GateID : 42502 (0xA606)
*Mar 17 02:31:52.673: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 02:31:52.673: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:31:52.673: -----
SLOT 7/1: Mar 17 02:31:52.651: Pktcbl(gdb): Gate ID 42502 not found in gdb, pktcbl_find_gate_ie.
SLOT 5/0: Mar 17 02:31:52.655: Pktcbl(gdb): Gate ID 42502 not found in gdb, pktcbl_find_gate_ie.
ubr10k#
ubr10k#
*Mar 17 02:32:25.667: Pktcbl(mm): Received GATE SET message, tid=0x6
*Mar 17 02:32:25.667: --- Pktcbl(mm): Received GCP message -----
*Mar 17 02:32:25.667: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:32:25.667: transaction id : 0x6
*Mar 17 02:32:25.667: gcp cmd : 4 (GATE SET)
*Mar 17 02:32:25.667: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:32:25.667: AM ID : 0x1 (0/1)
*Mar 17 02:32:25.667: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:32:25.667: Addr : 21.21.2.10
*Mar 17 02:32:25.667: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:32:25.667: GateID : 42502 (0xA606)
*Mar 17 02:32:25.667: GATE SPEC : Object.[snum/stype/len 5/1/16]
*Mar 17 02:32:25.667: flag : 0x3
*Mar 17 02:32:25.667: dscp : 0xD8
*Mar 17 02:32:25.667: dscp tos mask : 0xF0
*Mar 17 02:32:25.667: Timers t1 : 0, t2 : 0
*Mar 17 02:32:25.667: t3 : 0, t4 : 0
*Mar 17 02:32:25.667: session class : 0x0
*Mar 17 02:32:25.667: TRAFFIC PROFILE : Object.[snum/stype/len 7/6/56]
*Mar 17 02:32:25.667: envelope : 0x7
*Mar 17 02:32:25.667: service number : 0x0

```

```

*Mar 17 02:32:25.667: Authorized :
*Mar 17 02:32:25.667: Request Xmit Policy: 0x17F
*Mar 17 02:32:25.667: Grant size : 232
*Mar 17 02:32:25.667: Grant Per Interval : 2
*Mar 17 02:32:25.667: Grant Interval : 20000
*Mar 17 02:32:25.667: Tolerated Jitter : 800
*Mar 17 02:32:25.667: Required Mask : 0
*Mar 17 02:32:25.671: Forbidden Mask : 0
*Mar 17 02:32:25.671: Aggr Rule Mask : 0
*Mar 17 02:32:25.671: Reserved :
*Mar 17 02:32:25.671: Request Xmit Policy: 0x17F
*Mar 17 02:32:25.671: Grant size : 232
*Mar 17 02:32:25.671: Grant Per Interval : 2
*Mar 17 02:32:25.671: Grant Interval : 20000
*Mar 17 02:32:25.671: Tolerated Jitter : 800
*Mar 17 02:32:25.671: Required Mask : 0
*Ma
ubr10k#r 17 02:32:25.671: Forbidden Mask : 0
*Mar 17 02:32:25.671: Aggr Rule Mask : 0
*Mar 17 02:32:25.671: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 02:32:25.671: protocol : 1
*Mar 17 02:32:25.671: dscp : 0x0
*Mar 17 02:32:25.671: dscp tos mask : 0x0
*Mar 17 02:32:25.671: src/port : 9.9.1.95 0
*Mar 17 02:32:25.671: dest/port : 2.39.26.11 0
*Mar 17 02:32:25.671: priority : 64
*Mar 17 02:32:25.671: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 02:32:25.671: protocol : 1
*Mar 17 02:32:25.671: dscp : 0x0
*Mar 17 02:32:25.671: dscp tos mask : 0x0
*Mar 17 02:32:25.671: src/port : 9.9.1.43 0
*Mar 17 02:32:25.671: dest/port : 2.39.26.19 0
*Mar 17 02:32:25.671: priority : 64
*Mar 17 02:32:25.671: OPAQUE : Object.[snum/stype/le
ubr10k#n 11/1/12]
*Mar 17 02:32:25.671: data : [31 32 33 34 00 00 00 0]
*Mar 17 02:32:25.671: -----
*Mar 17 02:32:25.671: Backup gate IE [42502]
*Mar 17 02:32:25.671: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:32:25.671: Pktcbl(mm): Change profile 1 qos 1
*Mar 17 02:32:25.671: Pktcbl(gdb): IPC timer [id 42502] [10000 msec]
*Mar 17 02:32:25.671: Pktcbl(gdb): Started gate [id 42502] timer [type 8] [10000
msec]
*Mar 17 02:32:25.671: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:32:25.671: Pktcbl(gdb): MM gate spec: t1:200, t2:0, t3:0, t4:0
*Mar 17 02:32:25.671: Pktcbl(gdb): MM traffic profile type: 6
*Mar 17 02:32:25.671: Pktcbl(gdb): MM Authorized Profile
*Mar 17 02:32:25.671: Pktcbl(gdb): MM Reserved Profile
*Mar 17 02:32:25.671: Pktcbl(gdb): MM Committed Profile
*Mar 17 02:32:25.671: Classifier prototype: 1, src: 9.9.1.95, dest: 2.39.26.11,
src port: 0, dest port: 0
*Mar 17 02:32:25.671: Classifier prototype: 1, src: 9.9.1.43, dest: 2.39.26.19,
src port: 0, dest port: 0
*Mar 17 02:32:25.707: Pktcbl(mm): Received gate-set IPC RSP from LC for gate 425
02 rsp 1 state new(4) old(4)
*Mar 17 02:32:25.707: Pktcbl(gdb): Cancelled gate [id 42502] timer [type 8]
*Mar 17 02:32:25.707: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:32:25.707: Pktcbl(gdb): Started gate [id 42502] timer [type 3] [0 mse
c]
*Mar 17 02:32:25.707: Pktcbl(gdb): Cleanup saved gate IE info, gate(42502)
*Mar 17 02:32:25.707: PktCbl(d2r): extract id: gate=42502, resource=63
*Mar 17 02:32:25.707: Pktcbl(gdb): TOS Overwrite gate spec info,gate_id=42502 di
r=1 gie=265BD720
*Mar 17 02:32:25.707: Pktcbl(gdb): TOS Overwrite Gate=42502 DSCP=0xD0 mask=0xF

```

```

*Mar 17 02:32:25.707: PktCbl(d2r): extract id: gate=42502, resource=63
*Mar 17 02:32:25.707: PktCbl(mm-r2d): DSA-ACK notification received on RP, gateid 42502 sfid 63
*Mar 17 02:32:25.707: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:32:25.707: Pktcbl(gdb): Found Cable7/1/0 for Gate=42502 21.21.2.10
*Mar 17 02:32:25.707: Pktcbl(mm): Building GCP message, added obj TRANSACTION ID
; len:8 padding:0
*Mar 17 02:32:25.707: Pktcbl(mm): Building GCP message, added obj AM ID
; len:8 padding:0
*Mar 17 02:32:25.707: Pktcbl(mm): Building GCP message, added obj SUBSCRIBER ID
; len:8 padding:0
*Mar 17 02:32:25.707: Pktcbl(mm): Building GCP message, added obj GATE ID
; len:8 padding:0
*Mar 17 02:32:25.707: Pktcbl(mm): Building GCP message, added obj OPAQUE
; len:12 padding:0
*Mar 17 02:32:25.707: Pktcbl(mm): Built GCP message, GATE SET ACK , length: 44, copsLen 72
*Mar 17 02:32:25.707: --- Pktcbl: Sending GCP message -----
*Mar 17 02:32:25.707: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:32:25.707: transaction id : 0x6
*Mar 17 02:32:25.707: gcp cmd : 5 (GATE SET ACK)
*Mar 17 02:32:25.707: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:32:25.707: AM ID : 0x1 (0/1)
*Mar 17 02:32:25.707: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:32:25.707: Addr : 21.21.2.10
*Mar 17 02:32:25.707: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:32:25.707: GateID : 42502 (0xA606)
*Mar 17 02:32:25.707: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 02:32:25.707: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:32:25.707: -----

```

**Related Commands**

| Command                              | Description                                                                                                                  |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>cable dynamic-qos trace</b>       | Enables the call trace functionality on the Cisco CMTS router for PacketCable or PacketCable Multimedia service subscribers. |
| <b>debug cable dynamic-qos trace</b> | Enables call trace debugging on the Cisco CMTS router for all the subscribers for whom call trace is configured.             |
| <b>show cable dynamic-qos trace</b>  | Displays the number of subscribers for whom call trace is enabled on the Cisco CMTS router.                                  |

# debug cable dynamic-qos trace

To enable debugging of the call trace functionality on the Cisco CMTS router for all the subscribers for whom call trace is configured, use the **debug cable dynamic-qos trace** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

**debug cable dynamic-qos trace** [verbose]

**no debug cable dynamic-qos trace**

|                    |                                                                                            |
|--------------------|--------------------------------------------------------------------------------------------|
| Syntax Description | <b>verbose</b> (Optional) Provides detailed debugging information with the verbose output. |
|--------------------|--------------------------------------------------------------------------------------------|

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

| Command History               | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>Cisco IOS Release 12.2(33)SCF</td><td>This command was introduced.</td></tr></table> | Release | Modification | Cisco IOS Release 12.2(33)SCF | This command was introduced. |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-------------------------------|------------------------------|
| Release                       | Modification                                                                                                                                      |         |              |                               |                              |
| Cisco IOS Release 12.2(33)SCF | This command was introduced.                                                                                                                      |         |              |                               |                              |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | <p>The <b>debug cable dynamic-qos trace</b> command helps in debugging intermittent issues, which could be reproduced on any of the subscribers. Because the cable operator does not know which subscriber is likely to get intermittent issues, the operator cannot enable debugging for a particular subscriber. If debugging is enabled for all subscribers, this might impact the system performane due to huge volume of debugging output. With the PacketCable and PacketCable Multimedia (PCMM) call trace functionality, you can enable debugging only for the configured number of subscribers based on first-come first-served basis when a PacketCable call or PCMM session is attempted. The operator can periodically check if any of the subscribers is getting intermittent issues from the debug, or clear the logs and wait for the issue to surface on one of the subscribers having active trace.</p> <p>We recommend that you use the <b>debug cable dynamic-qos trace</b> command during off-peak hours or under lower CPU utilization.</p> <p>The following two debug commands enable most of the subscriber-based debug logs relevant to PacketCable, PCMM, and dynamic quality of service (DQoS) lite subscriber debugging:</p> <ul style="list-style-type: none"><li><b>debug cable dynamic-qos trace</b></li><li><b>debug cable dynamic-qos subscriber</b></li></ul> |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Examples**

The following example shows call trace debugging information for all subscribers on the Cisco uBR10012 router in Cisco IOS Release 12.2(33)SCF:

```
Router# debug cable dynamic-qos trace
```

```
CMTS dynqos trace debugging is on ubr10k#
```

```
*Mar 17 02:43:05.448: Pktcbl(mm): Received GATE SET message, tid=0x2
*Mar 17 02:43:05.448: --- Pktcbl(mm): Received GCP message -----
*Mar 17 02:43:05.448: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:43:05.448: transaction id : 0x2
*Mar 17 02:43:05.448: gcp cmd : 4 (GATE SET)
*Mar 17 02:43:05.448: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:43:05.448: AM ID : 0x1 (0/1)
*Mar 17 02:43:05.448: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:43:05.448: Addr : 21.21.2.10
*Mar 17 02:43:05.448: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:43:05.452: GateID : 58886 (0xE606)
*Mar 17 02:43:05.452: GATE SPEC : Object.[snum/stype/len 5/1/16]
*Mar 17 02:43:05.452: flag : 0x3
*Mar 17 02:43:05.452: dscp : 0xD8
*Mar 17 02:43:05.452: dscp tos mask : 0xF0
*Mar 17 02:43:05.452: Timers t1 : 0, t2 : 0
*Mar 17 02:43:05.452: t3 : 0, t4 : 0
*Mar 17 02:43:05.452: session class : 0x0
*Mar 17 02:43:05.452: TRAFFIC PROFILE : Object.[snum/stype/len 7/6/56]
*Mar 17 02:43:05.452: envelope : 0x7
*Mar 17 02:43:05.452: service number : 0x0
*Mar 17 02:43:05.452: Authorized :
*Mar 17 02:43:05.452: Request Xmit Policy: 0x17F
*Mar 17 02:43:05.452: Grant size : 232
*Mar 17 02:43:05.452: Grant Per Interval : 2
*Mar 17 02:43:05.452: Grant Interval : 20000
*Mar 17 02:43:05.452: Tolerated Jitter : 800
*Mar 17 02:43:05.452: Required Mask : 0
*Mar 17 02:43:05.452: Forbidden Mask : 0
*Mar 17 02:43:05.452: Aggr Rule Mask : 0
*Mar 17 02:43:05.452: Reserved :
*Mar 17 02:43:05.452: Request Xmit Policy: 0x17F
*Mar 17 02:43:05.452: Grant size : 232
*Mar 17 02:43:05.452: Grant Per Interval : 2
*Mar 17 02:43:05.452: Grant Interval : 20000
*Mar 17 02:43:05.452: Tolerated Jitter : 800
*Mar 17 02:43:05.452: Required Mask : 0
*Ma
ubr10k#r 17 02:43:05.452: Forbidden Mask : 0
*Mar 17 02:43:05.452: Aggr Rule Mask : 0
*Mar 17 02:43:05.452: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 02:43:05.452: protocol : 1
*Mar 17 02:43:05.452: dscp : 0x0
*Mar 17 02:43:05.452: dscp tos mask : 0x0
*Mar 17 02:43:05.452: src/port : 9.9.1.95 0
*Mar 17 02:43:05.452: dest/port : 2.39.26.11 0
*Mar 17 02:43:05.452: priority : 64
*Mar 17 02:43:05.452: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 02:43:05.452: protocol : 1
*Mar 17 02:43:05.452: dscp : 0x0
*Mar 17 02:43:05.452: dscp tos mask : 0x0
*Mar 17 02:43:05.452: src/port : 9.9.1.43 0
*Mar 17 02:43:05.452: dest/port : 2.39.26.19 0
*Mar 17 02:43:05.452: priority : 64
*Mar 17 02:43:05.452: OPAQUE : Object.[snum/stype/le
ubr10k#n 11/1/12]
```

```

*Mar 17 02:43:05.452: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:43:05.452: -----
*Mar 17 02:43:05.452: Backup gate IE [58886]
*Mar 17 02:43:05.452: Pktcbl(gdb): Found Cable7/1/0 for Gate=58886 21.21.2.10
*Mar 17 02:43:05.452: Pktcbl(mm): Change profile 1 qos 1
*Mar 17 02:43:05.452: Pktcbl(gdb): IPC timer [id 58886] [10000 msec]
*Mar 17 02:43:05.452: Pktcbl(gdb): Started gate [id 58886] timer [type 8] [10000
msec]
*Mar 17 02:43:05.452: Pktcbl(gdb): Found Cable7/1/0 for Gate=58886 21.21.2.10
*Mar 17 02:43:05.452: Pktcbl(gdb): MM gate spec: t1:200, t2:0, t3:0, t4:0
*Mar 17 02:43:05.452: Pktcbl(gdb): MM traffic profile type: 6
*Mar 17 02:43:05.452: Pktcbl(gdb): MM Authorized Profile
*Mar 17 02:43:05.452: Pktcbl(gdb): MM Reserved Profile
*Mar 17 02:43:05.452: Pktcbl(gdb): MM Committed Profile
*Mar 17 02:43:05.452: Classifier prototype: 1, src: 9.9.1.95, dest: 2.39.26.11,
src port: 0, dest port: 0
*Mar 17 02:43:05.452: Classifier prototype: 1, src: 9.9.1.43, dest: 2.39.26.19,
src port: 0, dest port: 0
*Mar 17 02:43:05.480: Pktcbl(mm): Received gate-set IPC RSP from LC for gate 588
86 rsp 1 state new(4) old(4)
*Mar 17 02:43:05.480: Pktcbl(gdb): Cancelled gate [id 58886] timer [type 8]
*Mar 17 02:43:05.480: Pktcbl(gdb): Found Cable7/1/0 for Gate=58886 21.21.2.10
*Mar 17 02:43:05.480: Pktcbl(gdb): Started gate [id 58886] timer [type 3] [0 mse
c]
*Mar 17 02:43:05.480: Pktcbl(gdb): Cleanup saved gate IE info, gate(58886)
*Mar 17 02:43:05.484: PktCbl(d2r): extract id: gate=58886, resource=64
*Mar 17 02:43:05.484: Pktcbl(gdb): TOS Overwrite gate spec info,gate_id=58886 di
r=1 gie=265BDB84
*Mar 17 02:43:05.484: Pktcbl(gdb): TOS Overwrite Gate=58886 DSCP=0xD0 mask=0xF
*Mar 17 02:43:05.484: PktCbl(d2r): extract id: gate=58886, resource=64
*Mar 17 02:43:05.484: PktCbl(mm-r2d): DSA-ACK notification received on RP, gatei
d 58886 sfid 64
*Mar 17 02:43:05.484: Pktcbl(gdb): Found Cable7/1/0 for Gate=58886 21.21.2.10
*Mar 17 02:43:05.484: Pktcbl(gdb): Found Cable7/1/0 for Gate=58886 21.21.2.10
*Mar 17 02:43:05.484: Pktcbl(mm): Building GCP message, added obj TRANSACTION ID
; len:8 padding:0
*Mar 17 02:43:05.484: Pktcbl(mm): Building GCP message, added obj AM ID
; len:8 padding:0
*Mar 17 02:43:05.484: Pktcbl(mm): Building GCP message, added obj SUBSCRIBER ID
; len:8 padding:0
*Mar 17 02:43:05.484: Pktcbl(mm): Building GCP message, added obj GATE ID
; len:8 padding:0
*Mar 17 02:43:05.484: Pktcbl(mm): Building GCP message, added obj OPAQUE
; len:12 padding:0
*Mar 17 02:43:05.484: Pktcbl(mm): Built GCP message, GATE SET ACK , lengt
h: 44, copsLen 72
*Mar 17 02:43:05.484: --- Pktcbl: Sending GCP message -----
*Mar 17 02:43:05.484: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:43:05.484: transaction id : 0x2
*Mar 17 02:43:05.484: gcp cmd : 5 (GATE SET ACK)
*Mar 17 02:43:05.484: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:43:05.484: AM ID : 0x1 (0/1)
*Mar 17 02:43:05.484: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:43:05.484: Addr : 21.21.2.10
*Mar 17 02:43:05.484: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:43:05.484: GateID : 58886 (0xE606)
*Mar 17 02:43:05.484: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 02:43:05.484: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:43:05.484: -----

```



The following example shows call trace debugging information for all subscribers when using the **debug cable dynamic-qos trace** command with the **verbose** keyword on the Cisco uBR10012 router in Cisco IOS Release 12.2(33)SCF:

Router# **debug cable dynamic-qos trace verbose**

CMTS dynqos trace verbose debugging is on ubr10k#

```
*Mar 17 02:45:47.180: Pktcbl(mm): Received GATE SET message, tid=0x3
*Mar 17 02:45:47.180: --- Pktcbl(mm): Received GCP message -----
*Mar 17 02:45:47.180: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:45:47.180: transaction id : 0x3
*Mar 17 02:45:47.180: gcp cmd : 4 (GATE SET)
*Mar 17 02:45:47.180: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:45:47.180: AM ID : 0x1 (0/1)
*Mar 17 02:45:47.180: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:45:47.180: Addr : 21.21.2.10
*Mar 17 02:45:47.180: GATE SPEC : Object.[snum/stype/len 5/1/16]
*Mar 17 02:45:47.180: flag : 0x3
*Mar 17 02:45:47.180: dscp : 0xD8
*Mar 17 02:45:47.180: dscp tos mask : 0xF0
*Mar 17 02:45:47.180: Timers t1 : 0, t2 : 0
*Mar 17 02:45:47.180: t3 : 0, t4 : 0
*Mar 17 02:45:47.180: session class : 0x0
*Mar 17 02:45:47.180: TRAFFIC PROFILE : Object.[snum/stype/len 7/6/56]
*Mar 17 02:45:47.180: envelope : 0x7
*Mar 17 02:45:47.180: service number : 0x0
*Mar 17 02:45:47.180: Authorized :
*Mar 17 02:45:47.180: Request Xmit Policy: 0x17F
*Mar 17 02:45:47.180: Grant size : 232
*Mar 17 02:45:47.180: Grant Per Interval : 1
*Mar 17 02:45:47.180: Grant Interval : 20000
*Mar 17 02:45:47.180: Tolerated Jitter : 800
*Mar 17 02:45:47.180: Required Mask : 0
*Mar 17 02:45:47.180: Forbidden Mask : 0
*Mar 17 02:45:47.180: Aggr Rule Mask : 0
*Mar 17 02:45:47.180: Reserved :
*Mar 17 02:45:47.180: Request Xmit Policy: 0x17F
*Mar 17 02:45:47.180: Grant size : 232
*Mar 17 02:45:47.180: Grant Per Interval : 1
*Mar 17 02:45:47.180: Grant Interval : 20000
*Mar 17 02:45:47.180: Tolerated Jitter : 800
*Mar 17 02:45:47.180: Required Mask : 0
*Mar 17 02:45:47.180: Forbidden Mask : 0
*Mar 17 02:45:47.180: Aggr Rule Mask : 0
*Mar 17 02:45:47.180: CLASSIFIER : Obj
ubr10k#ect.[snum/stype/len 6/1/24]
*Mar 17 02:45:47.180: protocol : 1
*Mar 17 02:45:47.180: dscp : 0x0
*Mar 17 02:45:47.180: dscp tos mask : 0x0
*Mar 17 02:45:47.180: src/port : 9.9.1.95 0
*Mar 17 02:45:47.180: dest/port : 2.39.26.11 0
*Mar 17 02:45:47.180: priority : 64
*Mar 17 02:45:47.180: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 02:45:47.180: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:45:47.180: -----
*Mar 17 02:45:47.180: Pktcbl(gdb): Allocating gate entry 0/4. Instance cnt: 1, g
ate_count is now 5
*Mar 17 02:45:47.180: Pktcbl(gdb): Updated subscriber IE [subs addr: 21.21.2.10,
gate: 75270]
*Mar 17 02:45:47.180: Pktcbl(gdb): Created gate IE on Cable7/1/0, gateid = 75270
*Mar 17 02:45:47.184: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:45:47.184: Pk
ubr10k#tcbl(mm): Change profile 0 qos 0
```

## debug cable dynamic-qos trace

```

*Mar 17 02:45:47.184: Pktcbl(gdb): IPC timer [id 75270] [10000 msec]
*Mar 17 02:45:47.184: Pktcbl(gdb): Started gate [id 75270] timer [type 8] [10000 msec]
*Mar 17 02:45:47.184: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:45:47.184: Pktcbl(gdb): MM gate spec: t1:200, t2:0, t3:0, t4:0
*Mar 17 02:45:47.184: Pktcbl(gdb): MM traffic profile type: 6
*Mar 17 02:45:47.184: Pktcbl(gdb): MM Authorized Profile
*Mar 17 02:45:47.184: Pktcbl(gdb): MM Reserved Profile
*Mar 17 02:45:47.184: Pktcbl(gdb): MM Committed Profile
*Mar 17 02:45:47.184: Classifier prototype: 1, src: 9.9.1.95, dest: 2.39.26.11, src port: 0, dest port: 0
*Mar 17 02:45:47.216: Pktcbl(mm): Received gate-set IPC RSP from LC for gate 75270 rsp 1 state new(4) old(2)
*Mar 17 02:45:47.220: Pktcbl(gdb): Cancelled gate [id 75270] timer [type 8]
*Mar 17 02:45:47.220: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:45:47.220: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:45:47.220: Pktcbl(gdb): Started gate [id 75270] timer [type 3] [0 msec]
*Mar 17 02:45:47.220: PktCbl(d2r): extract id: gate=75270, resource=65
*Mar 17 02:45:47.220: PktCbl(d2r): extract id: gate=75270, resource=65
*Mar 17 02:45:47.220: Pktcbl(gdb): TOS Overwrite gate spec info,gate_id=75270 dir=1 gie=26DD56A4
*Mar 17 02:45:47.220: Pktcbl(gdb): TOS Overwrite Gate=75270 DSCP=0xD0 mask=0xF
*Mar 17 02:45:47.220: PktCbl(d2r): extract id: gate=75270, resource=65
*Mar 17 02:45:47.220: PktCbl(mm-r2d): DSA-ACK notification received on RP, gateid 75270 sfid 65
*Mar 17 02:45:47.220: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:45:47.220: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:45:47.220: Pktcbl(mm): Building GCP message, added obj TRANSACTION ID ; len:8 padding:0
*Mar 17 02:45:47.220: Pktcbl(mm): Building GCP message, added obj AM ID ; len:8 padding:0
*Mar 17 02:45:47.220: Pktcbl(mm): Building GCP message, added obj SUBSCRIBER ID ; len:8 padding:0
*Mar 17 02:45:47.220: Pktcbl(mm): Building GCP message, added obj GATE ID ; len:8 padding:0
*Mar 17 02:45:47.220: Pktcbl(mm): Building GCP message, added obj OPAQUE ; len:12 padding:0
*Mar 17 02:45:47.220: Pktcbl(mm): Built GCP message, GATE SET ACK , length: 44, copsLen 72
*Mar 17 02:45:47.220: --- Pktcbl: Sending GCP message -----
*Mar 17 02:45:47.220: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:45:47.220: transaction id : 0x3
*Mar 17 02:45:47.220: gcp cmd : 5 (GATE SET ACK)
*Mar 17 02:45:47.220: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:45:47.220: AM ID : 0x1 (0/1)
*Mar 17 02:45:47.220: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:45:47.220: Addr : 21.21.2.10
*Mar 17 02:45:47.220: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:45:47.220: GateID : 75270 (0x12606)
*Mar 17 02:45:47.220: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 02:45:47.220: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:45:47.224: -----
SLOT 7/1: Mar 17 02:45:47.231: Pktcbl(gdb): Gate ID 75270 not found in gdb, pktcbl_find_gate_ie.
SLOT 5/0: Mar 17 02:45:47.227: Pktcbl(gdb): Gate ID 75270 not found in gdb, pktcbl_find_gate_ie.
ubr10k#
ubr10k#
*Mar 17 02:46:14.446: Pktcbl(mm): Received GATE SET message, tid=0x4
*Mar 17 02:46:14.446: --- Pktcbl(mm): Received GCP message -----
*Mar 17 02:46:14.446: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:46:14.446: transaction id : 0x4
*Mar 17 02:46:14.446: gcp cmd : 4 (GATE SET)

```

```

*Mar 17 02:46:14.446: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:46:14.446: AM ID : 0x1 (0/1)
*Mar 17 02:46:14.446: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:46:14.446: Addr : 21.21.2.10
*Mar 17 02:46:14.446: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:46:14.446: GateID : 75270 (0x12606)
*Mar 17 02:46:14.446: GATE SPEC : Object.[snum/stype/len 5/1/16]
*Mar 17 02:46:14.446: flag : 0x3
*Mar 17 02:46:14.446: dscp : 0xD8
*Mar 17 02:46:14.446: dscp tos mask : 0xF0
*Mar 17 02:46:14.446: Timers t1 : 0, t2 : 0
*Mar 17 02:46:14.446: t3 : 0, t4 : 0
*Mar 17 02:46:14.446: session class : 0x0
*Mar 17 02:46:14.446: TRAFFIC PROFILE : Object.[snum/stype/len 7/6/56]
*Mar 17 02:46:14.446: envelope : 0x7
*Mar 17 02:46:14.446: service number : 0x0
*Mar 17 02:46:14.446: Authorized :
*Mar 17 02:46:14.446: Request Xmit Policy: 0x17F
*Mar 17 02:46:14.446: Grant size : 232
*Mar 17 02:46:14.446: Grant Per Interval : 2
*Mar 17 02:46:14.446: Grant Interval : 20000
*Mar 17 02:46:14.446: Tolerated Jitter : 800
*Mar 17 02:46:14.446: Required Mask : 0
*Mar 17 02:46:14.446: Forbidden Mask : 0
*Mar 17 02:46:14.446: Aggr Rule Mask : 0
*Mar 17 02:46:14.446: Reserved :
*Mar 17 02:46:14.446: Request Xmit Policy: 0x17F
*Mar 17 02:46:14.446: Grant size : 232
*Mar 17 02:46:14.446: Grant Per Interval : 2
*Mar 17 02:46:14.446: Grant Interval : 20000
*Mar 17 02:46:14.446: Tolerated Jitter : 800
*Mar 17 02:46:14.446: Required Mask : 0
*M
ubr10k#ar 17 02:46:14.446: Forbidden Mask : 0
*Mar 17 02:46:14.446: Aggr Rule Mask : 0
*Mar 17 02:46:14.446: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 02:46:14.446: protocol : 1
*Mar 17 02:46:14.446: dscp : 0x0
*Mar 17 02:46:14.446: dscp tos mask : 0x0
*Mar 17 02:46:14.446: src/port : 9.9.1.95 0
*Mar 17 02:46:14.446: dest/port : 2.39.26.11 0
*Mar 17 02:46:14.446: priority : 64
*Mar 17 02:46:14.446: CLASSIFIER : Object.[snum/stype/len 6/1/24]
*Mar 17 02:46:14.446: protocol : 1
*Mar 17 02:46:14.446: dscp : 0x0
*Mar 17 02:46:14.446: dscp tos mask : 0x0
*Mar 17 02:46:14.446: src/port : 9.9.1.43 0
*Mar 17 02:46:14.446: dest/port : 2.39.26.19 0
*Mar 17 02:46:14.446: priority : 64
*Mar 17 02:46:14.446: OPAQUE : Object.[snum/stype/len 11/1/12]
ubr10k#en 11/1/12]
*Mar 17 02:46:14.446: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:46:14.446: -----
*Mar 17 02:46:14.450: Backup gate IE [75270]
*Mar 17 02:46:14.450: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:46:14.450: Pktcbl(gdb): Change profile 1 qos 1
*Mar 17 02:46:14.450: Pktcbl(gdb): IPC timer [id 75270] [10000 msec]
*Mar 17 02:46:14.450: Pktcbl(gdb): Started gate [id 75270] timer [type 8] [10000 msec]
*Mar 17 02:46:14.450: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:46:14.450: Pktcbl(gdb): MM gate spec: t1:200, t2:0, t3:0, t4:0
*Mar 17 02:46:14.450: Pktcbl(gdb): MM traffic profile type: 6
*Mar 17 02:46:14.450: Pktcbl(gdb): MM Authorized Profile
*Mar 17 02:46:14.450: Pktcbl(gdb): MM Reserved Profile

```

## debug cable dynamic-qos trace

```

*Mar 17 02:46:14.450: Pktcbl(gdb): MM Committed Profile
*Mar 17 02:46:14.450: Classifier prototype: 1, src: 9.9.1.95, dest: 2.39.26.11,
src port: 0, dest port: 0
*Mar 17 02:46:14.450: Classifier prototype: 1, src: 9.9.1.43, dest: 2.39.26.19,
src port: 0, dest port: 0
*Mar 17 02:46:14.482: Pktcbl(mm): Received gate-set IPC RSP from LC for gate 752
70 rsp 1 state new(4) old(4)
*Mar 17 02:46:14.482: Pktcbl(gdb): Cancelled gate [id 75270] timer [type 8]
*Mar 17 02:46:14.482: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:46:14.482: Pktcbl(gdb): Started gate [id 75270] timer [type 3] [0 mse
c]
*Mar 17 02:46:14.482: Pktcbl(gdb): Cleanup saved gate IE info, gate(75270)
*Mar 17 02:46:14.482: PktCbl(d2r): extract id: gate=75270, resource=65
*Mar 17 02:46:14.482: Pktcbl(gdb): TOS Overwrite gate spec info,gate_id=75270 di
r=1 gie=26DD56A4
*Mar 17 02:46:14.482: Pktcbl(gdb): TOS Overwrite Gate=75270 DSCP=0xD0 mask=0xF
*Mar 17 02:46:14.482: PktCbl(d2r): extract id: gate=75270, resource=65
*Mar 17 02:46:14.482: PktCbl(mm-r2d): DSA-ACK notification received on RP, gatei
d 75270 sfid 65
*Mar 17 02:46:14.482: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:46:14.482: Pktcbl(gdb): Found Cable7/1/0 for Gate=75270 21.21.2.10
*Mar 17 02:46:14.482: Pktcbl(mm): Building GCP message, added obj TRANSACTION ID
; len:8 padding:0
*Mar 17 02:46:14.482: Pktcbl(mm): Building GCP message, added obj AM ID
; len:8 padding:0
*Mar 17 02:46:14.482: Pktcbl(mm): Building GCP message, added obj SUBSCRIBER ID
; len:8 padding:0
*Mar 17 02:46:14.482: Pktcbl(mm): Building GCP message, added obj GATE ID
; len:8 padding:0
*Mar 17 02:46:14.482: Pktcbl(mm): Building GCP message, added obj OPAQUE
; len:12 padding:0
*Mar 17 02:46:14.482: Pktcbl(mm): Built GCP message, GATE SET ACK , lengt
h: 44, copsLen 72
*Mar 17 02:46:14.482: --- Pktcbl: Sending GCP message -----
*Mar 17 02:46:14.482: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
*Mar 17 02:46:14.482: transaction id : 0x4
*Mar 17 02:46:14.482: gcp cmd : 5 (GATE SET ACK)
*Mar 17 02:46:14.482: AM ID : Object.[snum/stype/len 2/1/8]
*Mar 17 02:46:14.482: AM ID : 0x1 (0/1)
*Mar 17 02:46:14.482: SUBSCRIBER ID : Object.[snum/stype/len 3/1/8]
*Mar 17 02:46:14.482: Addr : 21.21.2.10
*Mar 17 02:46:14.482: GATE ID : Object.[snum/stype/len 4/1/8]
*Mar 17 02:46:14.482: GateID : 75270 (0x12606)
*Mar 17 02:46:14.482: OPAQUE : Object.[snum/stype/len 11/1/12]
*Mar 17 02:46:14.482: data : [31 32 33 34 00 00 00 00]
*Mar 17 02:46:14.482: -----

```

## Related Commands

| Command                                   | Description                                                                                                |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>cable dynamic-qos trace</b>            | Enables the call trace functionality on the Cisco CMTS router for PacketCable or PCMM service subscribers. |
| <b>debug cable dynamic-qos subscriber</b> | Enables debugging of the call trace functionality on the Cisco CMTS router for a particular subscriber.    |
| <b>show cable dynamic-qos trace</b>       | Displays the number of subscribers for whom call trace is enabled on the Cisco CMTS router.                |

# debug cable dynamic-secret

To display debugging messages for the Dynamic Shared Secret feature, use the **debug cable dynamic-secret** command in privileged EXEC mode. To stop the display of debugging messages, use the **no** form of this command.

**debug cable dynamic-secret**

**no debug cable dynamic-secret**

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                                                                                            |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC1 | This command was introduced for Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers. |

## Usage Guidelines



### Tip

Because this command can produce a large volume of debug information, use this command only when you have also enabled debugging for a particular interface or MAC address, using the **debug cable interface** and **debug cable mac-address** commands, respectively.

## Examples

The following example shows how to enable debugging output using the **debug cable dynamic-secret** command:

```
Router# debug cable dynamic-secret
```

```
CMTS dynamic-secret debugging is on
```

```
Router#
```

The following example shows typical output for a cable modem that is reset and reregisters while the Dynamic Shared Secret feature is enabled:

```
02:15:59: Closing file for modem 00c0.2345.6789: New modem state from resetting to offline
02:16:10: Found file name in BOOT_FILE option
02:16:10: Parsing IP address from 10.10.35.200, len 10.. Got 10.10.35.200
Setting 10 bytes to PAD
```

```
02:16:10: Config file for 00c0.2345.6789 set to 10.8.35.200:/cm/UBsgvca698. Was
10.10.35.200:/cm/config.cm
```

```

02:16:10: Discarding contents of /cm/config.cm @ 10.10.35.200
02:16:10: File /cm/config.cm from 10.10.35.200 read successfully
02:16:10: Found file name in BOOT_FILE option
02:16:10: Parsing IP address from 10.10.35.200, len 10.. Got 10.10.35.200
Setting 10 bytes to PAD

02:16:10: Config file for 00c0.2345.6789 set to 10.10.35.200:/cm/wrkldJKDHS. Was
10.10.35.200:/cm/config.cm
02:16:15: Registration request from 00c0.2345.6789, SID 1 on Cable3/0/U0
02:16:15: TLV-Block Bytes:
02:16:15: 0x0000: 03 01 01 04 1F 01 01 01 02 04 00 3D 09 00 03 04
02:16:15: 0x0010: 00 01 F4 00 04 01 07 05 04 00 01 86 A0 06 02 00
02:16:15: 0x0020: 00 07 01 00 12 01 0A 06 10 97 C2 BA 04 6A 76 BD
02:16:15: 0x0030: AC 40 FA E6 EB CD 49 E9 54 07 10 89 86 20 E2 73
02:16:15: 0x0040: 16 EE 01 0B 24 4A 65 F8 55 93 90 0C 04 03 12 01
02:16:15: 0x0050: 09 08 03 00 06 28 05 1E 02 01 01 03 01 01 04 01
02:16:15: 0x0060: 01 06 01 01 07 01 00 08 01 04 0A 01 01 0B 01 08
02:16:15: 0x0070: 0C 01 01 01 01 01
02:16:15: Found Network Access TLV
02:16:15: Ntw Access Control : 1
02:16:15: Found Class Of Service TLV Block
02:16:15: Class Id : 1
02:16:15: Maximum Downstream Rate : 4000000
02:16:15: Maximum Upstream Rate : 128000
02:16:15: Upstream Traffic Priority : 7
02:16:15: Guaranteed Minimum Upstream Rate : 100000
02:16:15: Maximum Upstream Transmit Burst : 0
02:16:15: Privacy Enable : 0
02:16:15: Found Max CPEs TLV
02:16:15: Maximum Number Of CPEs : 10
02:16:15: Found CM-MIC TLV
02:16:15: CM MIC:
02:16:15: 0x0000: 97 C2 BA 04 6A 76 BD AC 40 FA E6 EB CD 49 E9 54
02:16:15: Found CMTS-MIC TLV
02:16:15: CMTS MIC:
02:16:15: 0x0000: 89 86 20 E2 73 16 EE 01 0B 24 4A 65 F8 55 93 90
02:16:15: Found CM IP Address TLV
02:16:15: Modem IP Address : 10.18.1.9
02:16:15: Vendor Id:
02:16:15: 0x0000: 00 06 28
02:16:15: Found Modem Capabilities TLV
02:16:15: DOCSIS Version : 1
02:16:15: Fragmentation Support : 1
02:16:15: Payload Header Suppresion Support : 1
02:16:15: Privacy Support : 1
02:16:15: Downstream SAID Support : 0
02:16:15: Upstream SID Support : 4
02:16:15: Tx Equalizer Taps Per Symbol : 1
02:16:15: Tx Equalizer Taps Support : 8
02:16:15: DCC Support : 1
02:16:15: Concatenation Support : 1
02:16:15: Computing CMTS-MIC using Dynamic Secret to validate REG-REQ data.
02:16:15: CMTS_MIC(rfc2104) failed text + key
02:16:15: CMTS_MIC(rfc2104) passed
02:16:15: Performing admission control check
02:16:15: Mapping Primary DOCSIS 1.0 CoS block into service flows
02:16:15: Added Modem Capabilities TLV:
02:16:15: 0x0000: 05 1E 02 01 01 03 01 01 04 01 01 06 01 01 07 01
02:16:15: 0x0010: 00 08 01 04 0A 01 01 0B 01 08 0C 01 01 01 01 01
02:16:15: ClassId:1 assigned SID:1
02:16:15: Added Service Class Data TLV:
02:16:15: 0x0000: 01 07 01 01 01 02 02 00 01
02:16:15: REG-RSP Status : ok (0)
02:16:15: Closing file for modem 00c0.2345.6789: New modem state from init(o) to online

```

```
02:16:15: Registration Response Transmitted
```

```
Router#
```

The following example shows the typical messages that are shown when you use the **clear cable modem lock** command to clear the lock on one or more cable modems that have failed the Dynamic Shared Secret checks and were locked into restrictive quality of service (QoS) configurations:

```
Router# clear cable modem all lock
```

```
01:46:37: Closing file for modem 00c0.2854.73f5: New modem state from online to offline
01:46:37: Closing file for modem 00c0.734e.b4aa: New modem state from online(pt) to
offline
01:46:37: Closing file for modem 00c0.7366.17cb: New modem state from init(d) to offline
01:46:37: Closing file for modem 00c0.80bc.22b5: New modem state from online to offline
```

```
Router#
```

The following debug message is displayed when the CMTS has verified the CMTS MIC in a Data-over-Cable Service Interface Specifications (DOCSIS) configuration file against the shared secret that is configured on a cable interface:

```
Validated against Shared secret
```

The CMTS displays the following debug message when the CMTS has verified the CMTS MIC in a DOCSIS configuration file against one of the 16 possible secondary shared secrets that are configured on a cable interface:

```
Validated against secondary secret 11
```

The CMTS displays the following debug message when the CMTS obtains a new DOCSIS configuration file from the TFTP server. The CMTS keeps this file in its internal cache for 30 seconds, so that it can be used for other cable modems that might request it.

```
Creating new cache for config-file.cm @ 10.10.10.21
```

The CMTS displays the following debug messages when it receives a registration request or TFTP request for a DOCSIS configuration file from a device that is not a cable modem. This can indicate that a user is trying to manually download a DOCSIS configuration file so that it can be decoded and modified.

```
MAC address 0102.0304.0506 not of a CM
MAC Address 0102.0304.0506, IP address 10.10.10.13 is not a modem
```

The CMTS displays the following debug message when it receives a TFTP request for an unknown TFTP server. This can indicate that a user is trying to download a DOCSIS configuration file from a local TFTP server.

```
TFTP server unknown for CM 0102.0304.0506
```

The CMTS displays the following debug message when it receives a TFTP request for a non-cable interface. This can indicate that a user is trying to spoof an IP or Ethernet MAC address, and is trying to access a TFTP server through the Internet or a local network.

```
TFTP request from a non-cable interface GE1/0/0 ignored
```

The CMTS displays the following debug messages when it receives a TFTP request for a DOCSIS configuration file that is not available on the TFTP server:

```
16:11:33: Could not locate bootfile name for 0102.0304.0506
16:11:33: Cannot locate config-file.cm requested by CM 0102.0304.0506
16:11:33: Closing file for modem 0102.0304.0506: New modem state from init(rc) to offline
```

| Related Commands | Command                              | Description                                                                                                                                                                                                              |
|------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dynamic-secret</b>          | Enables the Dynamic Shared Secret feature, so that DOCSIS configuration files are verified with a Message Integrity Check (MIC) that has been created with a dynamically generated shared secret.                        |
|                  | <b>cable shared-secondary-secret</b> | Configures one or more secondary shared secret keys that CMs can use to successfully process the DOCSIS configuration file and register with the CMTS.                                                                   |
|                  | <b>cable shared-secret</b>           | Configures an authentication shared secret key that CMs must use to successfully process the DOCSIS configuration file and register with the CMTS.                                                                       |
|                  | <b>cable tftp-enforce</b>            | Requires that all CMs on a cable interface attempt to download a DOCSIS configuration file using the Trivial File Transfer Protocol (TFTP) through the cable interface before being allowed to register and come online. |
|                  | <b>show cable modem rogue</b>        | Displays a list of cable modems that have been marked, locked, or rejected because they failed the dynamic shared-secret authentication checks.                                                                          |
|                  | <b>debug cable interface</b>         | Enables debugging output for a specific cable interface.                                                                                                                                                                 |
|                  | <b>debug cable mac-address</b>       | Enables debugging output for the cable modems that match the specified hardware (MAC) address or range of addresses.                                                                                                     |



# debug cable dynsrv

To display information about DOCSIS 1.1 dynamic service flow messages, use the **debug cable dynsrv** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable dynsrv**

**no debug cable dynsrv**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

Privileged EXEC

## Command History

| Release                  | Modification                                           |
|--------------------------|--------------------------------------------------------|
| 12.0(7)XR and 12.1(1a)T1 | This command was introduced for DOCSIS 1.0+ operation. |
| 12.1(4)CX                | This command was enhanced for DOCSIS 1.1 operation.    |
| 12.2(4)BC1               | Support was added to the Release 12.2 BC train.        |

## Usage Guidelines

This command activates dynamic service flow debugging, which displays a debugging message whenever one of the following DOCSIS 1.1 dynamic service messages is processed:

- Dynamic Service Add (DSA)—This message is used to create a new service flow.
- Dynamic Service Change (DSC)—This message is used to change the attributes of an existing service flow.
- Dynamic Service Deletion (DSD)—This message is used to delete an existing service flow.

Each type of dynamic service message includes a request (DSA-REQ, DSC-REQ, DSD-REQ) and a response (DSA-RSP, DSC-RSP, DSD-RSP).

Do not use this command when you have a large number of active CMs on your network, because it could generate a huge amount of output to the console port.



### Note

Debugging must be enabled for one or more cable interfaces, using the **debug cable interface** command, before the **debug cable dynsrv** command will display any output.



### Tip

If using the **debug cable dynsrv** command, also use the **debug cable mac-address** and the **debug cable tlvs** command to enable full DOCSIS MAC-layer debugging.

## Examples

The following example shows typical output displayed by the **debug cable dynsrv** command:

```
Router# debug cable interface c3/0
Router# debug cable dynsrv
CMTS dynsrv debugging is on
```

```
Router#
*May 5 05:15:36.531: DSA-REQ-RECD: OrgMac->0050.734e.b5b1 OrgId->52
*May 5 05:15:36.531: DSx-STATE-CREATED: OrgMac->0050.734e.b5b1 OrgId->52
*May 5 05:15:36.531: DSA-REQ TLV Information:
*May 5 05:15:36.531: Type Subtype Subtype Length Value
*May 5 05:15:36.531: 24 10
*May 5 05:15:36.531: 19 2 89
*May 5 05:15:36.531: 20 4 20000
*May 5 05:15:36.531: 80 69
*May 5 05:15:36.531: DSA-REQ: Requested QoS Parameter Information:
*May 5 05:15:36.531: Srv Flow Ref: 0 Grant Size: 89 Grant Intvl: 20000
*May 5 05:15:36.531: Requested QoS parameters match QoS Profile:3 (G729)
*May 5 05:15:36.531: DSA-REQ-SID-ASSIGNED: CM 0050.734e.b5b1 SID 11
*May 5 05:15:36.531: DSA-RSP-SEND: OrgMac->0050.734e.b5b1 OrgId->52
*May 5 05:15:36.531: DSA-RSP msg TLVs
*May 5 05:15:36.531: Type:Length:Value
*May 5 05:15:36.531: US QoS Encodings 24:8
*May 5 05:15:36.531: SID 3:2:11
*May 5 05:15:36.531: Service Flow Reference 1:2:0
*May 5 05:15:36.531: DSA-RSP hex dump:
*May 5 05:15:36.531: 0x0000: C2 00 00 26 00 00 00 50 73 4E B5 B1 00 10 0B AF
*May 5 05:15:36.531: 0x0010: BC 54 00 14 00 00 03 01 10 00 00 34 00 18 08 03
*May 5 05:15:36.531: 0x0020: 02 00 0B 01 02 00 00 00
```

| Related Commands | Command                 | Description                                                                                               |
|------------------|-------------------------|-----------------------------------------------------------------------------------------------------------|
|                  | debug cable interface   | Enables debugging on a specific cable interface.                                                          |
|                  | debug cable mac-address | Enables debugging for MAC-layer information for a specific CM.                                            |
|                  | debug cable tlvs        | Enables debugging for the Type/Length/Value encodings (TLVs) parsed by the DOCSIS 1.1 TLV parser/encoder. |
|                  |                         |                                                                                                           |

# debug cable encap

To enable debugging of encapsulated packets that are transmitted over the cable interface, use the **debug cable encap** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cable encap**

**no debug cable encap**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(11)BC3    | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>The <b>debug cable encap</b> command displays debugging messages about the following types of encapsulated packets:</p> <ul style="list-style-type: none"><li>• Debug messages prefixed with ENCAPSTR display information about CEF adjacency operations.</li><li>• Debug messages prefixed with VENCAP display information about MAC-layer encapsulation for switched packets (such as PPPoE and IP packets).</li></ul> |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The debug commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic. In particular, avoid using the **debug cable encap** command on an interface with a significant number of CMs, because the resulting volume of debug output could impact system performance. Cisco recommends that when you use the **debug cable encap** command, you limit its output to a particular interface or CM, using the **debug cable interface** or **debug cable mac-address** commands.

|                 |                                                                                                                                                                   |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | <p>The following shows typical output for the <b>debug cable encap</b> command. Messages are shown for both CEF adjacency and MAC-layer encapsulation events:</p> |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# debug cable encap
CMTS encap debugging is on
```

```
Router# clear adjacency
```

```
ENCAPSTR hwidb Cable3/1 idb Cable3/1.1 mac 0020.4072.7418 ipaddr 31.0.0.2 linktype 7
ENCAPSTR 0020.4072.7418 SID 2 STR 00000000800200204072741800D0582770540800
```

```
Router# ping 31.0.0.2
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 31.0.0.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/5/8 ms
```

**debug cable encap**

```
Router#

VENCAP hwidb Cable3/0 idb Cable3/1.1 mac 0020.4072.7418 ip 31.0.0.2 linktype 7
VENCAP 0020.4072.7418 SID 2 STR 00000076800200204072741800D0582770540800

VENCAP hwidb Cable3/0 idb Cable3/1.1 mac 0020.4072.7418 ip 31.0.0.2 linktype 7
VENCAP 0020.4072.7418 SID 2 STR 00000076800200204072741800D0582770540800

VENCAP hwidb Cable3/0 idb Cable3/1.1 mac 0020.4072.7418 ip 31.0.0.2 linktype 7
VENCAP 0020.4072.7418 SID 2 STR 00000076800200204072741800D0582770540800

VENCAP hwidb Cable3/0 idb Cable3/1.1 mac 0020.4072.7418 ip 31.0.0.2 linktype 7
VENCAP 0020.4072.7418 SID 2 STR 00000076800200204072741800D0582770540800

VENCAP hwidb Cable3/0 idb Cable3/1.1 mac 0020.4072.7418 ip 31.0.0.2 linktype 7
VENCAP 0020.4072.7418 SID 2 STR 00000076800200204072741800D0582770540800
```

| Related Commands | Command                 | Description                                                                          |
|------------------|-------------------------|--------------------------------------------------------------------------------------|
|                  | debug cable arp         | Enables debugging of the Address Resolution Protocol on the cable interface.         |
|                  | debug cable dhcp        | Enables debugging of the Dynamic Host Configuration Protocol on the cable interface. |
|                  | debug cable interface   | Enables debugging on a specific cable interface.                                     |
|                  | debug cable mac-address | Enables debugging for a particular CM.                                               |

# debug cable envm

To display information about the Cisco CMTS physical environment, including internal temperature, midplane voltages, fan performance, and power supply voltages, use the **debug cable env** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable envm**

**no debug cable envm**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3NA  | This command was introduced. |

**Usage Guidelines** This command is used to debug the sensor circuitry used to measure internal temperature, midplane voltages, fan performance, and power supply voltages on the Cisco CMTS console.

**Examples** The following example shows sample output displayed by the **debug cable envm** command

```
Router# debug cable envm
ENVM: ps id=0xFF0, v=0x2050, r=0xC0AB, pstype=1
ENVM: ps id=0x2FD0, v=0x2050, r=0x24201, pstype=27
NVM: Sensor 0: a2dref=131, a2dact=31, vref=12219, vact=1552 Alpha=8990, temp=27
```

Table 270 provides description for the output.

**Table 270** Sample Output for the debug cable envm Command

| Field  | Description                                                                                                                                             |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| ps id  | Power supply raw voltage reading.                                                                                                                       |
| pstype | Power supply type determined from ps ID, v, and r. If the Cisco CMTS contains dual power supplies, the ID information for two types is usually printed. |
| Sensor | Sensor number.                                                                                                                                          |
| a2dref | Analog-to-digital converter reference reading.                                                                                                          |
| a2dact | Analog-to-digital converter actual (measured reading).                                                                                                  |
| vref   | Reference voltage.                                                                                                                                      |
| vact   | Actual voltage.                                                                                                                                         |
| Alpha  | Raw temperature reading.                                                                                                                                |
| temp   | Temperature corresponding to Alpha.                                                                                                                     |

■ `debug cable envm`

**Related Commands**

| Command                       | Description                                                       |
|-------------------------------|-------------------------------------------------------------------|
| <code>show environment</code> | Displays the temperature and voltage information for the chassis. |

# debug cable error

To display errors that occur in the cable MAC protocols, use the **debug cable err** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable error**

**no debug cable error**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3NA  | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                      |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command displays unexpected DOCSIS MAC protocol messages. When the Cisco CMTS does not expect to receive a specific MAC message, or if a packet contains errors in size or content, an error message and a hex dump of the packet are printed. Other miscellaneous error conditions may also show up in output. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                       |
|-----------------|---------------------------------------------------------------------------------------|
| <b>Examples</b> | The following shows typical output displayed by the <b>debug cable error</b> command. |
|-----------------|---------------------------------------------------------------------------------------|

```
Router# debug cable error
Router#
00:19:22: Receive data error, status=0x0D04
00:19:22: Receive data error:
00:19:22: Prepend data:
 5C 1E 00 02 00 5F 58 5F 01 12 36 FF F2 00 00 00
00:19:22: Packet data (size=36):
00:19:22: 0x000: C2 00 00 1E 8E 07 00 E0 1E D7 CC 94 00 50 73 18
00:19:22: 0x010: E9 F1 00 0C
00:19:22:
```

# debug cable flap

To display information about the operation of the CM flap list that is maintained for the cable interfaces, use the **debug cable flap** command in the Privileged EXEC mode. To disable debugging output, use the **no** form of this command.

```
debug cable flap
no debug cable flap
```

**Syntax Description**    This command has no arguments or keywords.

**Defaults**    No default behavior or values.

**Command Modes**    Privileged EXEC (#)

| Command History | Release             | Modification                                                             |
|-----------------|---------------------|--------------------------------------------------------------------------|
|                 | 11.3(8)NA, 12.0(4)T | This command was introduced for Cisco uBR7200 series routers.            |
|                 | 12.0(6)SC           | Support for this command was added to the Release 12.0 SC.               |
|                 | 12.1(5)EC           | Support for this command was added for the Cisco uBR7100 series routers. |
|                 | 12.2(4)BC1          | Support was added to the Release 12.2 BC.                                |
|                 | 12.2(11)BC2         | Support for this command was added to the Release 12.2 BC.               |

**Usage Guidelines**    This command shows debugging messages about the operation of the CM flap list that is maintained for the cable interfaces.

  
**Caution**

The debug commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic.

**Examples**    The following example enables debugging for the CM flap list:

```
Router# debug cable flap

CMTS flap debugging is on

Router# show debug
CMTS:
 CMTS flap debugging is on
Router#
```



When debugging is turned on and a CM is added to the flap list the Cisco CMTS displays the following message:

```
Cable modem <<mac address>> added to flap-list
```

When debugging is turned on and a CM is removed from the flap list, the Cisco CMTS displays the following message:

```
Cable modem <<mac address>> removed from flap-list (<<number>> seconds after last flap)
```

When debugging is turned on and the Cisco CMTS checks the flap list for aged out CMs that need to be removed from the list, the CMTS displays the following message:

```
CMTS flap list aging check (interval = 120 min)
```

#### Related Commands

|                                               |                                                                                                    |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>cable flap-list aging</b>                  | Specifies the number of days to keep a CM in the flap-list table before aging it out of the table. |
| <b>cable flap-list insertion-time</b>         | Sets the insertion time interval that determines whether a CM is placed in the flap list.          |
| <b>cable flap-list miss-threshold</b>         | Specifies miss threshold for recording a flap-list event.                                          |
| <b>cable flap-list power-adjust threshold</b> | Specifies the power-adjust threshold for recording a CM flap-list event.                           |
| <b>cable flap-list size</b>                   | Specifies the maximum number of CMs that can be listed in the flap-list table.                     |
| <b>clear cable flap-list</b>                  | Clears all the entries in the flap-list table.                                                     |
| <b>ping docsis</b>                            | Sends a DOCSIS ping to a CM and increments the flap-list counters as appropriate.                  |
| <b>show cable flap-list</b>                   | Displays the current contents of the flap list.                                                    |

# debug cable fn

To enable debugging information for cable fiber nodes, use the **debug cable fn** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable fn**

**no debug cable fn**

**Syntax Description** This command has no keywords or arguments.

**Command Default** No cable fiber node debug messages are enabled.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                               |
|-----------------|------------|------------------------------------------------------------|
|                 | 12.3(21)BC | This command was introduced for the Cisco uBR10012 router. |

**Usage Guidelines** The **debug cable fn** command is intended for use by Cisco technical support personnel.



**Caution**

Because debugging output is assigned high priority in the CPU process, it can render the system unusable. For this reason, use **debug** commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support personnel. Moreover, it is best to use **debug** commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased debug command processing overhead will affect system use.

For general (non-wideband) information on CMTS debugging commands, see the *Cisco Broadband Cable Command Reference Guide*.

**Examples**

The following example shows how to enable debug messages for cable fiber nodes:

```
Router# debug cable fn

CMTS fiber node debugging is on

...
```

The following sample messages are displayed when RF channels 0 and 1 are removed from fiber node 1:

```
Router(config)# cable fiber 1
Router(config-fiber-node)# no downstream modular-cable 3/0/0 rf-channel 0 - 1
...
*Nov 7 17:42:27.903: fn_get_cdb: cdb slot 3(3) subslot 0(0)appl_no 0(0)
*Nov 7 17:42:27.903: cfg_cable_fn_cmd: fiber-node 1 status 0x01 cmd 3 sense 0
```

```

*Nov 7 17:42:27.903: no downstream FN 1, 3/0/0 port range 0 - 1
*Nov 7 17:42:27.903: no downstream FN 1, 3/0/0 bg_rfch 000000000000000004
*Nov 7 17:42:27.903: set FN 1 status old 0x01 to new 0x01
*Nov 7 17:42:27.903: fn_freq_unique: FN 1
*Nov 7 17:42:27.903: prim_rfch 35 slot 8 subslot 1 unit 0
*Nov 7 17:42:27.903: prim_rfch 35 freq 555000000 channel_id 203
*Nov 7 17:42:27.903: bg_rfch 2 slot 3 subslot 0 unit 2
*Nov 7 17:42:27.903: fn_get_cdb: cdb slot 3(3) subslot 0(0)appl_no 0(2)
*Nov 7 17:42:27.903: bg_rfch 2 freq 711000000 channel_id 26
*Nov 7 17:42:27.903: clr FN 1 status old 0x01 to new 0x01
*Nov 7 17:42:27.903: fn_channel_id_unique: FN 1
*Nov 7 17:42:27.903: prim_rfch 35 slot 8 subslot 1 unit 0
*Nov 7 17:42:27.903: prim_rfch 35 freq 203 channel_id 203
*Nov 7 17:42:27.903: bg_rfch 2 slot 3 subslot 0 unit 2
*Nov 7 17:42:27.903: fn_get_cdb: cdb slot 3(3) subslot 0(0)appl_no 0(2)
*Nov 7 17:42:27.903: bg_rfch 2 freq 711000000 channel_id 26
*Nov 7 17:42:27.903: clr FN 1 status old 0x01 to new 0x01
*Nov 7 17:42:27.903: fn_bundle_same: FN 1
*Nov 7 17:42:27.903: prim_rfch 35 slot 8 subslot 1 unit 0
*Nov 7 17:42:27.903: prim_rfch 35 nb_hwidb Cable8/1/0 bundle 1
*Nov 7 17:42:27.903: bg_rfch 2 slot 3 subslot 0 unit 2
*Nov 7 17:42:27.903: fn_get_cdb: cdb slot 3(3) subslot 0(0)appl_no 0(2)
*Nov 7 17:42:27.903: clr FN 1 status old 0x01 to new 0x01
*Nov 7 17:42:27.903: cfg_cable_fn_cmd: fiber-node 1 status 0x01
*Nov 7 17:42:35.267: FN 1 save context status 0x01(0x01)
*Nov 7 17:42:35.267: FN 1 status 0x01 saved status 0x01)
*Nov 7 17:42:35.267: fiber-node 1 update SG status = 0x01
*Nov 7 17:42:35.267: DS-SG: Updating Association Table from DS-SG. Current: 0x1 New: 0x0
*Nov 7 17:42:35.267: DS-SG: Updating the Wideband Channel Mask: 0x0

```

**Related Commands**

| Command                    | Description                                          |
|----------------------------|------------------------------------------------------|
| <b>debug c10k-jacket</b>   | Enables debugging information for the Wideband SIP.  |
| <b>debug cable wbcmts</b>  | Enables debugging information for the wideband CMTS. |
| <b>debug hw-module bay</b> | Enables debugging information for a Wideband SPA.    |

# debug cable freqhop

To display debug messages for frequency hopping, use the **debug cable freqhop** command in privileged EXEC mode. Use the **no** form of this command to disable debugging output.

```
debug cable freqhop

no debug cable freqhop
```

Syntax Description

This command has no arguments or keywords.

| Command History | Release   | Modification                 |
|-----------------|-----------|------------------------------|
|                 | 12.0(4)XI | This command was introduced. |

Examples

The following example shows how to display debug messages for frequency hopping:

```
router# debug cable interface c6/0
router# debug cable freqhop
CMTS freqhop debugging is on
router#
Sep 27 10:36:41.202: Cable5/0 U0: last hop delta: 1
Sep 27 10:36:42.202: Cable5/0 U0: last hop delta: 2
```

# debug cable hw-spectrum

To display debug messages for spectrum management (frequency agility), use the **debug cable hw-spectrum** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cable hw-spectrum**

**no debug cable hw-spectrum**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release   | Modification                                                              |
|-----------------|-----------|---------------------------------------------------------------------------|
|                 | 11.3 NA   | This command was introduced as <b>debug cable specmgmt</b> .              |
|                 | 12.0(4)XI | This command was enhanced and renamed to <b>debug cable hw-spectrum</b> . |

**Examples** The following shows how to enable **debug cable hw-spectrum** debugging.

```
Router# debug cable hw-spectrum
CMTS spectrum analyzer debugging is on
Router#
```

| Related Commands | Command                     | Description                                                       |
|------------------|-----------------------------|-------------------------------------------------------------------|
|                  | <b>debug cable specmgmt</b> | Displays debugging output for the CMTS spectrum analyzer process. |

# debug cable interface

To display debug messages for a specific cable interface, or for traffic related to a specific MAC address or Service ID (SID) on that interface, use the **debug cable interface** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

```
debug cable interface cable {slot/port | slot/subslot/port} [mac-address address [mask] | sid
number [track] | [verbose]]

no debug cable interface cable {slot/port | slot/subslot/port} [mac-address address [mask] | sid
number [track] | [verbose]]
```

|                    |                          |                                                                                                                                                                                                                                                                                                                                            |
|--------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | slot/port                | Identifies the cable interface and downstream port on the Cisco uBR7100 series and Cisco uBR7200 series routers.<br><br>On the Cisco uBR7100 series router, the only valid value is <b>1/0</b> . On the Cisco uBR7200 series router, <i>slot</i> can range from 3 to 6, and <i>port</i> can be 0 or 1, depending on the cable interface.   |
|                    | slot/subslot/port        | Identifies the cable interface on the Cisco uBR10012 router. The following are the valid values: <ul style="list-style-type: none"><li>slot = 5 to 8</li><li>subslot = 0 or 1</li><li>port = 0 to 4 (depending on the cable interface)</li></ul>                                                                                           |
|                    | mac-address address mask | (Optional) Specifies that debugging is to be done only on traffic related to the specified MAC <i>address</i> . An optional <i>mask</i> can be specified to indicate a range of MAC addresses. The <i>mask</i> is ANDed with the <i>address</i> to determine which bits of the address must match to be included in the debugging display. |
|                    | sid number               | (Optional) Specifies that debugging is to be done only on traffic related to the specified SID. The valid range is from 1 to 8191.                                                                                                                                                                                                         |
|                    | track                    | (Optional) Enables SID tracking on a cable interface line card.                                                                                                                                                                                                                                                                            |
|                    | verbose                  | (Optional) Displays detailed debug information.                                                                                                                                                                                                                                                                                            |
|                    |                          |                                                                                                                                                                                                                                                                                                                                            |

|          |                                                                                                                                                                           |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Defaults | Debugging for the cable interfaces is not enabled, which means most of the other <b>debug cable</b> commands will not display any output, even when debugging is enabled. |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

| Command History | Release     | Modification                                                                                                                                                   |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.0(6)T    | This command was introduced.                                                                                                                                   |
|                 | 12.2(33)SCC | This command was integrated into Cisco IOS Release 12.2(33)SCC. A new keyword, <b>track</b> , was added to enable SID tracking on a cable interface line card. |

### Usage Guidelines

The **debug cable interface** command must be used to enable debugging on a cable interface before other **debug** commands can be used on that interface. The **mac-address** and **sid** options can be used to restrict the debug output to only those messages that are related to a specific MAC address or SID, so that the volume of debug messages does not affect system performance.

### Examples

The following example shows how to enable debugging on the cable interface in slot 6:

```
Router# debug cable interface c6/0
Router# show debug
CMTS specific:
Debugging is on for Cable6/0
Router#
```

The following shows how to enable verbose debugging on the cable interface in slot 6:

```
Router# debug cable interface c6/0 verbose
Router# show debug
CMTS specific:
Debugging is on for Cable6/0 (verbose)
Router#
```

The following example shows how to enable debugging on the cable interface in slot 6 for all traffic coming from CMs and other devices with MAC addresses that match the address range 0010.0000.0000 through 0010.00FF.FFFF (0010.00xx.xxxx):

```
Router# debug cable interface c6/0 mac-address 0010.0000.0000 FFFF.FF00.0000
Router# show debug
CMTS specific:
Debugging is on for Cable6/0, Address 0010.0000.0000, Mask ffff.ff00.0000
Router#
```

### Related Commands

| Command                        | Description                                                                                                   |
|--------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>debug cable dynsrv</b>      | Displays debugging information about DOCSIS 1.1 dynamic service flow messages.                                |
| <b>debug cable mac-address</b> | Enables debugging on traffic from CMs with the specific MAC address or within the specific MAC address range. |

# debug cable ipv6

To enable debugging of IPv6 transactions on a cable interface on a Cisco CMTS router, use the **debug cable ipv6** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cable ipv6** [**db** | **dhcp** | **ha** | **lq** | **nd** | **source-verify**]

**no debug cable ipv6**

## Syntax Description

|                      |                                                                                                            |
|----------------------|------------------------------------------------------------------------------------------------------------|
| <b>db</b>            | (Optional) Displays messages associated with host database transactions.                                   |
| <b>dhcp</b>          | (Optional) Displays messages associated with Dynamic Host Control Protocol for IPv6 (DHCPv6) transactions. |
| <b>ha</b>            | (Optional) Displays messages associated with high availability (HA) IPv6 transactions.                     |
| <b>lq</b>            | (Optional) Displays messages associated with leasequery (LQ) transactions.                                 |
| <b>nd</b>            | (Optional) Displays messages associated with Neighbor Discovery (ND) transactions.                         |
| <b>source-verify</b> | (Optional) Displays messages associated with source verification transactions.                             |

## Command Modes

Privileged EXEC (#)

## Command History

| Release      | Modification                                                                                   |
|--------------|------------------------------------------------------------------------------------------------|
| 12.2(33)SCA  | This command was introduced.                                                                   |
| 12.2(33)SCF1 | This command was modified. The <b>lq</b> keyword was added to display leasequery transactions. |

## Usage Guidelines

The debug commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic. In particular, avoid using the **debug cable ipv6** command on an interface with a significant number of CMs, because the resulting volume of debug output could impact system performance. We recommend that when you use the **debug cable ipv6** command, you limit its output to a particular interface or cable modem (CM), using the **debug cable interface** or **debug cable mac-address** commands.

## Related Commands

| Command                        | Description                                                                                    |
|--------------------------------|------------------------------------------------------------------------------------------------|
| <b>debug cable arp</b>         | Enables debugging of the Address Resolution Protocol on the cable interface.                   |
| <b>debug cable encap</b>       | Enables debugging of encapsulated PPPoE packets that are transmitted over the cable interface. |
| <b>debug cable interface</b>   | Enables debugging on a specific cable interface.                                               |
| <b>debug cable mac-address</b> | Enables debugging on a particular CM.                                                          |



# debug cable keyman

To activate debugging of TEK and KEK BPI key management, use the **debug cable keyman** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cable keyman**

**no debug cable keyman**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3NA  | This command was introduced. |

**Usage Guidelines** This command activates debugging of the TEK and KEK baseline privacy key activity. When this command is activated, all activity related to KEK and TEK keys is displayed on the Cisco CMTS console. This command is used to display encryption key management debugging output.



**Note**

This command is supported only on images that support BPI or BPI+ encryption.

**Examples** The following shows typical output from the **debug cable keyman** command.

```
Router# debug cable keyman
Router#

Dec 11 23:16:19.139: CMTS Received AUTH REQ.
Dec 11 23:16:19.139: Created a new CM key for 0010.7b43.aa2f.
Dec 11 23:16:19.139: CMTS generated AUTH_KEY.
Dec 11 23:16:19.139: Input : 23FD16A701FD2091
Public Key :
Dec 11 23:16:19.139: 30 68 02 61 00 C1 26 6F 53 3E CE 17 AB 18 84 C5
Dec 11 23:16:19.139: 63 B3 A2 DA 66 29 96 13 23 B8 A3 C8 AF B7 CF C8
Dec 11 23:16:19.139: 54 6B 16 14 E2 9B 12 0B 34 79 51 DA 18 AB DE 8C
Dec 11 23:16:19.139: 65 8F 0B 8A AB 25 3B 88 F1 6D 53 5F 64 C3 3E 50
Dec 11 23:16:19.139: 81 57 AA C5 8F CE 4F 3C A8 96 2F 60 0F F6 30 E6
Dec 11 23:16:19.139: 91 61 29 42 E1 C2 96 0F CB 10 EF F9 0D 6F 45 76
Dec 11 23:16:19.139: 1D 17 FD 26 6D 02 03 01 00 01
Dec 11 23:16:19.139:
Dec 11 23:16:19.139: RSA public Key subject:
Dec 11 23:16:19.143: 30 7C 30 0D 06 09 2A 86 48 86 F7 0D 01 01 01 05
Dec 11 23:16:19.143: 00 03 6B 00 30 68 02 61 00 C1 26 6F 53 3E CE 17
Dec 11 23:16:19.143: AB 18 84 C5 63 B3 A2 DA 66 29 96 13 23 B8 A3 C8
Dec 11 23:16:19.143: AF B7 CF C8 54 6B 16 14 E2 9B 12 0B 34 79 51 DA
Dec 11 23:16:19.143: 18 AB DE 8C 65 8F 0B 8A AB 25 3B 88 F1 6D 53 5F
Dec 11 23:16:19.143: 64 C3 3E 50 81 57 AA C5 8F CE 4F 3C A8 96 2F 60
Dec 11 23:16:19.143: 0F F6 30 E6 91 61 29 42 E1 C2 96 0F CB 10 EF F9
```

**debug cable keyman**

```
Dec 11 23:16:19.143: 0D 6F 45 76 1D 17 FD 26 6D 02 03 01 00 01
Dec 11 23:16:19.155: RSA encryption result = 0
Dec 11 23:16:19.155: Output :
Dec 11 23:16:19.155: 88 5F 67 22 86 68 2B 1D A6 F4 E9 62 43 58 1A C8
Dec 11 23:16:19.155: 49 97 7E 81 EE EF B0 DD C4 42 30 FD 24 B0 54 2E
Dec 11 23:16:19.155: 01 CC 84 53 BD 71 50 9D B3 82 4D 7B 49 42 E1 F0
Dec 11 23:16:19.155: 2D 67 3D 46 CB 27 4D 60 16 00 4D EE E1 F3 FD 1D
Dec 11 23:16:19.155: 9C E6 03 3C 77 C8 3A 44 B9 FA 34 2E 44 1B 69 F4
Dec 11 23:16:19.155: AA 68 BF BB A5 43 9B F7 85 82 ED 39 45 02 92 56
Dec 11 23:16:19.155: CMTS sent AUTH response.
Dec 11 23:16:24.267: CMTS Received TEK REQ.
Dec 11 23:16:24.267: Message Digest Verification Failed.
Dec 11 23:16:24.267: Sending KEK INVALID.
Dec 11 23:16:24.323: CMTS Received AUTH REQ.
Dec 11 23:16:24.323: Find a match CM key for abcd.0123.4455
```

| Related Commands | Command             | Description                                                                              |
|------------------|---------------------|------------------------------------------------------------------------------------------|
|                  | debug cable bpiatp  | Displays debugging information for BPI-related messages that the CMTS sends or receives. |
|                  | debug cable privacy | Displays debugging information whenever the BPI state changes or a BPI event occurs.     |

# debug cable l2-vpn

To display debugging messages for the Layer 2 mapping of cable modems to particular permanent virtual connections (PVC) or to a virtual local area network (VLAN), use the **debug cable l2-vpn** command in privileged EXEC mode. To stop the display of debugging messages, use the **no** form of this command.

**debug cable l2-vpn [conditional]**

**no debug cable l2-vpn [conditional]**



## Note

This command is not supported for the Cisco uBR10012 router, through release 12.3(13a)BC.

## Syntax Description

**conditional** (Optional) Displays the packets that are sent or received for a particular cable modem or cable interface.

**Note** The **conditional** option does not display any output until you have also enabled debugging for a particular interface, using the **debug cable interface** command, or for a particular MAC address, using the **debug cable mac-address** command.

## Command Default

No default behavior or values

## Command Modes

Privileged EXEC

## Command History

| Release     | Modification                                                                                                                                                                                                  |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(11)BC3 | This command was introduced for Cisco uBR7100 series and Cisco uBR7246VXR universal broadband routers to debug the Layer 2 mapping of cable modems to a PVC on an Asynchronous Transfer Mode (ATM) interface. |
| 12.2(15)BC2 | Support was added for the debugging of the Layer 2 mapping of cable modems to a virtual local area network (VLAN) on an outbound Ethernet interface.                                                          |

## Usage Guidelines

The **debug cable l2-vpn** command displays status information for the mapping of cable modems to PVCs on an ATM interface (see the **cable vc-map** command) or to a VLAN on an Ethernet, Fast Ethernet, or Gigabit Ethernet interface (see the **cable dot1q-vc-map** command). The debug messages show when a cable modem is mapped to a PVC or VLAN, when the mapping is changed or removed, and when packets are sent and received over the mapping.

The **conditional** option displays information for each packet that is sent and received over an ATM PVC or VLAN mapping. Because this can produce a large volume of debug information, the **conditional** option can be used only when you have also enabled debugging for a particular interface or MAC address, using the **debug cable interface** and **debug cable mac-address** commands, respectively.

**Examples**

The following example shows typical output for the **debug cable l2-vpn** command when a cable modem is mapped to an ATM PVC:

```
Router# debug cable l2-vpn

CMTS L2 VPN debugging is on

Router# configure terminal
Router(config)# cable l2-vpn-service atm-vc
Router(config)# cable vc-map 0007.0e03.69f9 ATM2/0 1/1

6d00h: Associating vc ATM2/0.1 1/1 to CM 0007.0e03.69f9 sid 0x1
6d00h: Writing vc-map info to sid 0x1

Router(config)#
```

The following example shows typical output for the **debug cable l2-vpn** command when a cable modem is mapped to an IEEE 802.1Q VLAN:

```
Router# debug cable l2-vpn

CMTS L2 VPN debugging is on

Router# configure terminal
Router(config)# cable l2-vpn-service dot1q
Router(config)# cable dot1q-vc-map 0007.0e03.69f9 FastEthernet0/0 5
Router(config)#

Set promiscuous mode for FastEthernet0/0
Mapped DS srv flow 13 on Cable5/0 to FastEthernet0/0 VLAN 5
Mapped US srv flow 11 sid 31 on Cable5/0 to FastEthernet0/0 VLAN 5
```

The following example shows typical output for the **debug cable l2-vpn** command when a mapping is deleted:

```
Router# debug cable l2-vpn

CMTS L2 VPN debugging is on

Router# configure terminal
Router(config)# no cable vc-map 0007.0e03.69f9 ATM2/0 1/1

6d00h: Disassociating vc ATM2/0.1 1/1 from CM 0007.0e03.69f9 sid 0x1
6d00h: Erasing vc-map info to sid 0x1

Router(config)#
```

The following example shows typical output for the **conditional** option. This example shows output for traffic to and from one particular cable modem. Each debug message shows the size of the packet, the source and destination MAC addresses, the cable interface and SID being used, and the ATM interface and PVC/PVI being used.

```
Router# debug cable mac-address 000C.0807.06.05
Router# debug cable l2-vpn conditional

CMTS L2 VPN conditional debugging is on

6d00h: Fwd pkt size 74 from 000C.0807.0605 on Cable4/0:0x1 to 0900.2b00.000f on ATM2/0:1/1
6d00h: Fwd pkt size 74 from 000C.0807.0605 on Cable4/0:0x1 to 0900.07ff.ffff on ATM2/0:1/1
6d00h: Fwd pkt size 1028 from 000C.0807.0605 on Cable4/0:0x1 to 0002.4a1d.dc1d on
ATM2/0:1/1
```

```

6d00h: Send pkt size 1020 encsize 6 from 0002.4a1d.dc1d on ATM2/0:1/1 to 000C.0807.0605 on
Cable4/0:0x1
6d00h: Fwd pkt size 74 from 000C.0807.0605 on Cable4/0:0x1 to 0900.07ff.ffff on ATM2/0:1/1

Router#

```

| Related Commands | Command                               | Description                                                                                                                                                                                             |
|------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dot1q-vc-map</b>             | Maps a cable modem to a particular Virtual Local Area Network (VLAN) on a local outbound Ethernet interface.                                                                                            |
|                  | <b>cable l2-vpn-service atm-vc</b>    | Enables the use of Layer 2 tunnels for the Customer Premises Equipment (CPE) traffic that is behind cable modems, so that individual CPE traffic can be routed to a particular PVC on an ATM interface. |
|                  | <b>cable l2-vpn-service dot1q</b>     | Enables the use of Layer 2 tunnels so that traffic for individual cable modems can be routed over a particular Virtual Local Area Network (VLAN).                                                       |
|                  | <b>cable vc-map</b>                   | Maps a cable modem to a particular PVC on an ATM interface.                                                                                                                                             |
|                  | <b>debug cable interface</b>          | Enables debugging output for a specific cable interface.                                                                                                                                                |
|                  | <b>debug cable mac-address</b>        | Enables debugging output for the cable modems that match the specified hardware (MAC) address or range of addresses.                                                                                    |
|                  | <b>show cable l2-vpn dot1q-vc-map</b> | Displays the mapping of one or all cable modems to IEEE 802.1Q Virtual Local Area Networks (VLANs) on the router's Ethernet interfaces.                                                                 |
|                  | <b>show cable l2-vpn vc-map</b>       | Displays the mapping of one or all cable modems to PVCs on the ATM interfaces.                                                                                                                          |

# debug cable load-balance

To display debugging messages for load-balancing operations on the router, use the **debug cable load-balance** command in privileged EXEC mode. To stop the display of debugging messages, use the **no** form of this command.

- debug cable load-balance [error]**
- no debug cable load-balance [error]**

|                    |              |                                                                                                                                                                    |
|--------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>error</b> | (Optional) Displays debugging messages about errors that might occur during load-balancing operations about the actual number of CMs that are active on a channel. |
|--------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                               |
|-----------------|-------------------------------|
| Command Default | No default behavior or values |
|-----------------|-------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

| Command History | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>12.2(15)BC1</td><td>This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers.</td></tr></table> | Release | Modification | 12.2(15)BC1 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers. |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-------------|----------------------------------------------------------------------------------|
| Release         | Modification                                                                                                                                                                        |         |              |             |                                                                                  |
| 12.2(15)BC1     | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 routers.                                                                                                    |         |              |             |                                                                                  |

|                  |                                                                                                                                                                                                                                                                                            |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | The <b>debug cable load-balance</b> command displays debugging output for when cable modems come online those cable interfaces that are part of a load balance group. It also displays debugging messages when cable modems are moved to achieve balanced loads on those cable interfaces. |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Tip

Because this command can produce a large volume of debug information, Cisco recommends that you limit debugging output to a particular interface or MAC address, using the **debug cable interface** and **debug cable mac-address** commands, respectively.

|          |                                                                                                                              |
|----------|------------------------------------------------------------------------------------------------------------------------------|
| Examples | The following example shows typical output for the <b>debug cable load-balance</b> command for a particular cable interface: |
|----------|------------------------------------------------------------------------------------------------------------------------------|

```
Router# debug cable interface c3/0
Router# debug cable load-balance

CMTS load balancing debugging is on

*Feb 13 13:39:21.594 PDT: lb: Removing Modem entry 0050.7318.e615: at target (upstream)

*Feb 13 13:39:50.754 PDT: lb: US request from Cable3/0/U0[0050.7366.1f7b]: target U3
[enforce], 0 retries

*Feb 13 12:53.010 PDT: lb: Moving Modem 0050.7366.218b from Cable3/0/U0 to U2
```

```
*Feb 13 13:40:03.034 PDT: lb: Moving Modem 0050.7366.1c7f from Cable3/0/U1 to U2
*Feb 13 13:40:04.790 PDT: lb: US request from Cable3/0/U1[0050.7318.e615]: target U2
[enforce], 0 retries
*Feb 13 13:40:11.150 PDT: lb: Removing Modem entry 0050.7318.e615: at target (upstream)
*Feb 13 13:40:23.042 PDT: lb: Moving Modem 0050.7366.21c7 from Cable3/0/U0 to U3
*Feb 13 13:40:23.042 PDT: lb: Moving Modem 0050.7366.2197 from Cable3/0/U0 to U3
*Feb 13 13:40:23.042 PDT: lb: Moving Modem 0050.7366.1f75 from Cable3/0/U0 to U3
```

Router#

The following example shows typical output for the **debug cable load-balance** command when the **error** option is used to display messages about possible errors in the number of CMs that are active on the interface.

```
Router# debug cable interface c5/1/0
Router# debug cable load-balance error
```

Router#

CMTS load balancing error debugging is on

```
lb: c5/1/0/U4: Total modems: 126 active modems: 123
c5/1/0: delete_sid_state on modem 0001.0203.0405 in state offline
```

## Related Commands

| Command                                                   | Description                                                                                                                           |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable load-balance exclude</b>                         | Excludes a particular cable modem, or all cable modems from a particular vendor, from one or more types of load-balancing operations. |
| <b>cable load-balance group (global configuration)</b>    | Creates and configures a load-balance group.                                                                                          |
| <b>cable load-balance group (interface configuration)</b> | Assigns a downstream to a load-balance group.                                                                                         |
| <b>cable load-balance group interval</b>                  | Configures the frequency of the load-balancing policy updates.                                                                        |
| <b>cable load-balance group policy ugs</b>                | Configures how the Cisco CMTS should load balance cable modems with active unsolicited grant service (USG) service flows.             |
| <b>cable load-balance group threshold</b>                 | Configures the threshold values that a load-balance group should use for load-balancing operations.                                   |
| <b>cable upstream load-balance group</b>                  | Assigns an upstream to a load-balance group.                                                                                          |
| <b>clear cable load-balance</b>                           | Clears the counters or state machine used to track load-balancing operations.                                                         |
| <b>debug cable interface</b>                              | Enables debugging output for a specific cable interface.                                                                              |
| <b>debug cable l2-vpn</b>                                 | Displays debugging messages for load-balancing operations on the router.                                                              |
| <b>debug cable mac-address</b>                            | Enables debugging output for the cable modems that match the specified hardware (MAC) address or range of addresses.                  |
| <b>show cable load-balance</b>                            | Displays real-time statistical and operational information for load-balancing operations.                                             |

# debug cable mac-address

To display debug information for a specific CM, use the **debug cable mac** command in privileged EXEC mode. The **no** form of this command disables debugging output.

```
debug cable mac-address address [address-mask] [verbose]

no debug cable mac-address address [address-mask] [verbose]
```

Syntax Description

|                     |                                                                                                                                                                                                           |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>address</i>      | Specifies the particular MAC address to debug.                                                                                                                                                            |
| <i>address-mask</i> | Specifies an address mask to indicate a range of addresses to debug. This mask is bit-ANDed with the given address, and debug messages are displayed for any CM that matches the resulting non-zero bits. |
| <b>verbose</b>      | Specifies detailed output for the particular MAC address.                                                                                                                                                 |

Command Modes

Privileged EXEC

Command History

| Release | Modification                 |
|---------|------------------------------|
| 12.1 T  | This command was introduced. |

Usage Guidelines

You can repeat this command for other MAC addresses. Each time you specify a different MAC address, debugging is turned on for that particular MAC address.

If you enter two commands with the same MAC address, but with different values for the *mask* or **verbose** keywords, the router treats both commands as the same. In this case, the latest debugging information supersedes the previous debugging information.



Note

Do not use this command if you have a large number of CMs on your network. The Cisco CMTS will become flooded with console printouts.

Examples

The following example demonstrates how to enable debugging for all traffic coming from cable interface 3/0 of CMs with the MAC address 00E0.1Exx.xxxx:

```
Router# debug cable interface c3/0
Router# debug cable mac-address 00E0.1E00.0000 ffff.ff00.0000
Router#
004042: Jul 2 08:47:13.656: Ranging Modem 00E0.1E23.4567, SID 73 on Interface Cable3/U0
004043: Jul 2 08:47:13.656: Ranging request from 00E0.1E23.4567, SID 73 [73] on Interface
Cable3/U0
004044: Jul 2 08:47:13.656: Timing error 0, power error 0.25dB, freq error 4 (adjust 0)
004045: Jul 2 08:47:13.656: Ranging successful
```



Tip

To monitor a specific CM when it comes online, use the **debug cable mac-address**, **debug cable mac-protocol**, and **debug cable registration** commands.



**Table 0-271** *debug cable mac Command Field Descriptions*

| Field                       | Description                                                                                                                                                                                                                                   |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SID value is....            | Reports the service ID of the modem. The range is from 1 through 891. The information on this line should agree with the first line of the return (that is, Ranging Modem with Sid...).                                                       |
| CM mac address....          | The MAC address of the specified CM.                                                                                                                                                                                                          |
| Timing offset is....        | The time by which to offset the frame transmission upstream so that the frame arrives at the expected minislot time at the CMTS.                                                                                                              |
| Power value is FE0, or 0 dB | The raw value derived from the 3137 Broadcom chip. Alternatively, the dB value specifies the relative change in the transmission power level that the CM needs to make sure that transmissions arrive at the CMTS at the desired power level. |
| Freq Error = ....           | The raw value derived from the 3137 Broadcom chip.                                                                                                                                                                                            |
| Freq offset is ....         | Specifies the relative change in the transmission frequency that the CM will make to match the CMTS.                                                                                                                                          |

**Related Commands**

| Command                          | Description                                                                                               |
|----------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>debug cable dynsrv</b>        | Displays debugging information about DOCSIS 1.1 dynamic service flow messages.                            |
| <b>debug cable interface</b>     | Enables debugging output for a specific cable interface.                                                  |
| <b>debug cable mac-protocol</b>  | Displays debugging output for the MAC layer protocol.                                                     |
| <b>debug cable mac-scheduler</b> | Displays debugging output for the MAC layer scheduler and admission control activities.                   |
| <b>debug cable registration</b>  | Displays debugging output for the registration messages sent when a CM comes online with the CMTS.        |
| <b>debug cable tlvs</b>          | Enables debugging for the Type/Length/Value encodings (TLVs) parsed by the DOCSIS 1.1 TLV parser/encoder. |
| <b>show controllers cable</b>    | Displays interface controller information for the specified slot.                                         |

# debug cable mac-protocol

To display MAC-layer information for a specific CM, use the **debug cable mac** command in privileged EXEC mode. The **no** form of this command disables debugging output.

**debug cable mac-protocol**  
**no debug cable mac-protocol**

**Syntax Description**    This command has no arguments or keywords.

**Command Modes**    Privileged EXEC

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 12.1 T  | This command was introduced. |

**Usage Guidelines**    Do not use this command if you have a large number of CMs on your network. The Cisco CMTS will become flooded with console printouts.

**Examples**    The following example shows the return for the MAC layer:

```
router# debug cable mac-protocol

CMTS mac debugging is on
19:46:27: Ranging Modem with Sid 1 on i/f : Cable6/0/U0

19:46:27: Got a ranging request
19:46:27: SID value is 1 on Interface Cable6/0/U0
19:46:27: CM mac address 00:E0:1E:B2:BB:07
19:46:27: Timing offset is 0
19:46:27: Power value is FE0, or 0 dB
19:46:27: Freq Error = 0, Freq offset is 0
19:46:27: Ranging has been successful for SID 1 on Interface Cable6/0/U0

19:46:29: Ranging Modem with Sid 2 on i/f : Cable6/0/U0
19:46:29: Got a ranging request
19:46:29: SID value is 2 on Interface Cable6/0/U0
19:46:29: CM mac address 00:E0:1E:B2:BB:8F
19:46:29: Timing offset is 1
19:46:29: Power value is 1350, or 0 dB
19:46:29: Freq Error = 0, Freq offset is 0
19:46:29: Ranging has been successful for SID 2 on Interface Cable6/0/U0

19:46:32: Ranging Modem with Sid 3 on i/f : Cable6/0/U0

19:46:32: Got a ranging request
19:46:32: SID value is 3 on Interface Cable6/0/U0
19:46:32: CM mac address 00:E0:1E:B2:BB:B1
19:46:32: Timing offset is FFFFFFFF
19:46:32: Power value is 1890, or -1 dB
```

```

19:46:32: Freq Error = 0, Freq offset is 0
19:46:32: Ranging has been successful for SID 3 on Interface Cable6/0/U0

19:46:34: Ranging Modem with Sid 5 on i/f : Cable6/0/U0

```

**Tip**

To monitor a specific CM when it comes online, use the **debug cable mac-address**, **debug cable mac-protocol**, and **debug cable registration** commands.

**Table 0-272**     *debug cable mac-protocol Command Field Descriptions*

| Field                       | Description                                                                                                                                                                                                                          |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SID value is....            | Reports the service ID of the modem. The range is from 1 through 8191. The information on this line should agree with the first line of the return (that is, Ranging Modem with Sid...).                                             |
| CM mac address....          | The MAC address of the specified CM.                                                                                                                                                                                                 |
| Timing offset is....        | The time by which to offset the frame transmission upstream so that the frame arrives at the expected minislot time at the CMTS.                                                                                                     |
| Power value is FE0, or 0 dB | The raw value derived from the Broadcom chip. Alternately, the dB value specifies the relative change in the transmission power level that the CM needs to make so that transmissions arrive at the CMTS at the desired power level. |
| Freq Error = ....           | The raw value derived from the Broadcom chip.                                                                                                                                                                                        |
| Freq offset is ....         | Specifies the relative change in the transmission frequency that the CM will make to match the CMTS.                                                                                                                                 |

#### Related Commands

| Command                          | Description                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------|
| <b>debug cable interface</b>     | Enables debugging output for a specific cable interface.                                           |
| <b>debug cable mac-address</b>   | Displays debugging output for the CMs that match the specified address or range of addresses.      |
| <b>debug cable mac-scheduler</b> | Displays debugging output for the MAC layer scheduler and admission control activities.            |
| <b>debug cable registration</b>  | Displays debugging output for the registration messages sent when a CM comes online with the CMTS. |
| <b>show controllers cable</b>    | Displays interface controller information for the specified slot.                                  |

# debug cable mac-scheduler

To display information for the MAC layer’s scheduler and admission control activities, use the **debug cable mac-scheduler** command in privileged EXEC mode. The **no** form of this command disables debugging output.

```
debug cable mac-scheduler [admission control | upstream-utilization | ubg]

no debug cable mac-scheduler [admission control | upstream-utilization | ubg]
```

Syntax Description

|                      |                                                                                                                                                                          |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| admission-control    | (Optional) Displays debugging output for the MAC scheduler’s admission control activities, which controls the percentage of overbooking allowed on the upstream channel. |
| upstream-utilization | (Optional) Displays debugging output for upstream utilization.                                                                                                           |
| ubg                  | (Optional) Displays debugging output for all upstream bonding groups.                                                                                                    |

Command Modes

Privileged EXEC

Command History

| Release     | Modification                                                                            |
|-------------|-----------------------------------------------------------------------------------------|
| 12.1(4)CX   | This command was introduced for the Cisco uBR10012 router.                              |
| 12.2(4)BC1  | Support for this command was added to the Release 12.2 BC train.                        |
| 12.2(33)SCC | A new keyword, <b>ubg</b> , was added to this command in Cisco IOS Release 12.2(33)SCC. |

Usage Guidelines

Do not use this command if you have a large number of CMs on your network. The Cisco CMTS will become flooded with console printouts.



Caution

The debug commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic. In particular, avoid using the **debug cable mac-scheduler** command on an interface with a significant number of CMs, because the resulting volume of debug output could impact system performance. Cisco recommends that when you use the **debug cable mac-scheduler** command, you limit its output to a particular interface or CM, using the **debug cable mac-address** or **debug cable interface** commands.

Examples

The following example shows debugging being turned on for the MAC scheduler:

```
Router# debug cable mac-scheduler
CMTS scheduler debugging is on

Router#
```

The following example shows admission-control debugging being turned on for a particular CM with the MAC address of 000C.1234.5678, and the typical messages that appear if the CM cannot register because the channel is oversubscribed.

```

Router# debug cable mac-address 000C.1234.5678 verbose
Router# debug cable mac-scheduler admission-control
CMTS scheduler debugging is on

Router#

Oct 23 09:38:56.701: MSCHED_CAC: Admit req for US service flow.
Oct 23 09:38:56.701: SFID=3 SID=1 AdmQoS=5
Oct 23 09:38:56.701: Admission check for BE service
Oct 23 09:38:56.701: Min rsvd rate : 1800000 bps
Oct 23 09:38:56.701: Failed to allocate bandwidth
Oct 23 09:38:56.701: Admit req rejected.

```

The following example shows the debugging output for upstream bonding groups on a particular CM with the MAC address of 001e.6bfb.153c:

```

Router# debug cable mac-address 001e.6bfb.153c verbose
Router# debug cable mac-scheduler ubg

CMTS mac-scheduler ubg debugging is on

5:38:17 PM?Jul 21 12:07:01.318: cmts_schedule_solc_bgrant:Sid=8 US[2] sc=0/0 type=5
bytes:1605 cbi_p:0xE326494
Jul 21 12:07:01.318: cmts_schedule_solc_bgrant: num_chan: 4, avail_chan: 4
Jul 21 12:07:01.318: cmts_schedule_solc_bgrant: shp_delay = 0 partial_len = 0 num_bytes =
6420
Jul 21 12:07:01.318: cmts_sched_alloc_sbi_p: Alloc sbi_p: 0x1FB7F984
Jul 21 12:07:01.318: cmts_sched_alloc_bg_pgrant_p: alloc bg_pg_p: 0x1FB87938
Jul 21 12:07:01.318: cmts_sched_slotq_enq_bpgrant:bg_pg_p:0x1FB87938 sid:8 US[2]
sbip:0x1FB7F984 bytes:0 ref:1
Jul 21 12:07:01.318: cmts_sched_slotq_enq_breq: US[1]: sbip:0x1FB7F984 sbi.tbytes:1605
ref:2 Sid=8 bytes:1605, mslots:75
Jul 21 12:07:01.318: cmts_sched_slotq_enq_breq: US[2]: sbip:0x1FB7F984 sbi.tbytes:3210
ref:3 Sid=8 bytes:1605, mslots:75
Jul 21 12:07:01.318: cmts_sched_slotq_enq_breq: US[3]: sbip:0x1FB7F984 sbi.tbytes:4815
ref:4 Sid=8 bytes:1605, mslots:75
Jul 21 12:07:01.318: cmts_sched_slotq_enq_breq: US[4]: sbip:0x1FB7F984 sbi.tbytes:6420
ref:5 Sid=8 bytes:1605, mslots:75
Jul 21 12:07:01.318: cmts_sched_free_sbi_p: sbi_p:0x1FB7F984 Sid=8 ref:5
Jul 21 12:07:01.318: cmts_sched_free_sbi_p: sbi_p:0x1FB7F984 Sid=8 ref:4
Jul 21 12:07:01.318: cmts_sched_free_sbi_p: sbi_p:0x1FB7F984 Sid=8 ref:3
Jul 21 12:07:01.318: cmts_sched_free_sbi_p: sbi_p:0x1FB7F984 Sid=8 ref:2
Jul 21 12:07:01.322: cmts_sched_free_sbi_p: sbi_p:0x1FB7F984 Sid=0 ref:1
Jul 21 12:07:01.322: cmts_sched_free_sbi_p: Free sbi_p: 0x1FB7F984
Jul 21 12:07:01.322: cmts_sched_free_bg_pgrant_p: free bg_pg_p: 0x1FB87938

```

#### Related Commands

|                                         |                                                                                               |
|-----------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>cable upstream admission-control</b> | Determines the percentage of overbooking allowed on the upstream channel.                     |
| <b>debug cable mac-address</b>          | Displays debugging output for the CMs that match the specified address or range of addresses. |
| <b>debug cable mac-protocol</b>         | Displays debug messages for the MAC-layer protocol.                                           |
| <b>debug cable us-adm-ctrl</b>          | Displays debug messages for upstream admission control activity.                              |

# debug cable map

To display debugging messages for DOCSIS MAC-layer MAP messages, use the **debug cable map** command in privileged EXEC mode. The **no** form of this command disables debugging output.

**debug cable map** [**error** | **sid** [*sid-num*] ]

**no debug cable map** [**error** | **sid** [*sid-num*] ]

Syntax Description

|                               |                                                                                                                                                                                                                                   |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>error</b>                  | Displays debugging messages about DOCSIS MAP messages that were received with errors.                                                                                                                                             |
| <b>sid</b> [ <i>sid-num</i> ] | Specifies the specific service ID (SID) to be debugged in DOCSIS MAP messages. The valid range for the optional <i>sid-num</i> value is 1 to 8191. If <i>sid-num</i> is not specified, debugging messages are shown for all SIDs. |

Command Modes

Privileged EXEC

Command History

| Release     | Modification                       |
|-------------|------------------------------------|
| 12.1 T      | This command was introduced.       |
| 12.2(15)BC1 | The <b>error</b> option was added. |

Examples

The following example shows how to display all MAP messages, with and without data grants:

```
Router# debug cable map

19:41:53: On interface Cable6/0, sent 5000 MAPs, 1321 MAPs had grant(s)Long Grants
13256993, Total Short Grants 223

----- MAP MSG -----
us_ch_id: 1 ucd_count: 5 num_elems: 9 reserved: 0
Alloc Start Time: 33792 Ack Time: 33618
Rng_bkoff_start: 0 Rng_bkoff_end: 2
Data_bkoff_start: 1 Data_bkoff_end: 3:
sid:16383 iuc:1 mslot_offset:0
sid:0 iuc:7 mslot_offset:40

----- MAP MSG -----
us_ch_id: 1 ucd_count: 5 num_elems: 7 reserved: 0
Alloc Start Time: 33712 Ack Time: 33578
Rng_bkoff_start: 0 Rng_bkoff_end: 2
Data_bkoff_start: 1 Data_bkoff_end: 3
sid:2 iuc:6 mslot_offset:0
sid:16383 iuc:1 mslot_offset:16
sid:0 iuc:7 mslot_offset:40
```

[Table 0-273](#) describes the fields displayed by the **debug cable map** command.

**Table 0-273** *debug cable map Field Descriptions*

| Field                         | Description                                                                                                               |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| sent 5000 MAPs                | Total number of maps transmitted.                                                                                         |
| MAPs had grant(s) Long Grants | Total number of grants considered long-sized by CMTS.                                                                     |
| Total Short Grants            | Total number of grants considered short-sized by CMTS.                                                                    |
| us_ch_id                      | Identifies the upstream channel ID for this message.                                                                      |
| ucd_count                     | Number of upstream channel descriptors (UCDs).                                                                            |
| num_elems                     | Number of information elements in the map.                                                                                |
| reserved                      | Reserved for alignment.                                                                                                   |
| Alloc Start Time              | Start time from CMTS initialization (in minislots) for assignments in this map.                                           |
| Ack Time                      | Latest time from CMTS initialization (in minislots) processed in upstream. The CMs use this time for collision detection. |
| Rng_bkoff_start               | Initial backoff window for initial ranging contention, expressed as a power of 2. Valid values are from 0 to 15.          |
| Rng_bkoff_end                 | Final backoff window for initial ranging contention, expressed as a power of 2. Valid values are from 0 to 15.            |
| Data_bkoff_start              | Initial backoff window for contention data and requests, expressed as a power of 2. Valid values are from 0 to 15.        |
| Data_bkoff_end                | Final backoff window for contention data and requests, expressed as a power of 2. Valid values are from 0 to 15.          |
| sid                           | Service ID.                                                                                                               |
| iuc                           | Interval usage code (IUC) value.                                                                                          |
| mslot_offset                  | Minislot offset.                                                                                                          |

The following shows typical output for the **debug cable map error** command:

```
Router# debug cable int cable 4/0
Router# debug cable map error
CMTS map errors debugging is ON

Router#

00:11:21: ##### Bad IE-offset for prenull IE[1]
#####----- MAP MSG -----
us_ch_id: 1 ucd_count: 11 num_elems: 4 reserved: 0
Alloc Start Time: 20007713 Ack Time: 20007291
Rng_bkoff_start: 0 Rng_bkoff_end: 3
Data_bkoff_start: 0 Data_bkoff_end: 4
sid:16383 iuc:1 mslot_offset:0
sid:16383 iuc:1 mslot_offset:0
sid:16383 iuc:1 mslot_offset:158
sid:0 iuc:7 mslot_offset:160
```

**Related Commands**

| Command                       | Description                                                       |
|-------------------------------|-------------------------------------------------------------------|
| <b>show controllers cable</b> | Displays interface controller information for the specified slot. |

# debug cable metering

To enable debugging of usage-based billing operations, use the **debug cable metering** command in privileged EXEC mode. To turn off debugging messages, use the **no** form of this command.

- debug cable metering**
- no debug cable metering**

**Syntax Description**    This command has no arguments or keywords.

**Command Modes**    Privileged EXEC

| Command History | Release    | Modification                 |
|-----------------|------------|------------------------------|
|                 | 12.3(9a)BC | This command was introduced. |

**Examples**    The following example shows how to enable debugging for usage-based billing on the Cisco CMTS, and then shows examples of the debugging messages that can be displayed.

```
Router# debug cable metering
CMTS metering debug is ON

Router#

Cannot get Metering CMTS IP/MAC Addresses.
CMTS Billing ip address interface name c6/0
CMTS SFLOG File BBCMTS_20000708-120931 open failed (23)
CMTS Metering open file CMTS0120000708-120931 successfully.
CMTS Metering LOCAL data to write 5600, wrote 4800 to file local file
CMTS Metering data to write 6400, wrote 6400 to file B_20000708-120931
CMTS Metering invalid FD for metering file
CMTS Metering Produce Metering - END Time= 2002-05-25T14:41:29Z
CMTS Metering closed file
CMTS Metering: xml end queue data malloc failed.
CMTS Metering file header len=480
CMTS Metering: xml header enqueue failed.
CMTS Metering: xml header enqueue OK.
CMTS Metering: xml end queue data malloc failed.
CMTS Metering xml_ending len 128
CMTS Metering: xml end enqueue OK.
CMTS Metering element header length 440
CMTS Metering sflog read buf = 4800
CMTS Metering: malloc failed.
CMTS Metering: SFLOG file 4800 size tx failed.
CMTS Metering: SFLOG tx OK 4800 size.
Cmts Metering: SFLOG file doesn't exist
CMTS Metering abort producing billing due to file open failure.
CMTS Metering: enqueue failed
CMTS Metering get invalid CM.
CMTS Metering valid cm 192.168.100.101, prim sid 13
CMTS Metering interval 30
Invalid Metering Timer Expired...Stop Timer.
```



| Related Commands | Command                               | Description                                                                                      |
|------------------|---------------------------------------|--------------------------------------------------------------------------------------------------|
|                  | <b>cable metering destination</b>     | Enables usage-based billing and streams the billing records to an external server.               |
|                  | <b>cable metering filesystem</b>      | Enables usage-based billing and writes the billing records to a file on a local file system.     |
|                  | <b>show cable metering-status</b>     | Displays information about the most recent usage-based billing operation.                        |
|                  | <b>snmp-server enable traps cable</b> | Enables the sending of Simple Network Management Protocol (SNMP) traps for cable-related events. |

# debug cable mdd

To display debugging messages of the MAC domain descriptor, use the **debug cable mdd** command in privileged EXEC mode. To turn off debugging, use the **no** form of this command.

**debug cable mdd**

**no debug cable mdd**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                  |
|-----------------|-------------|---------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Examples** The following is a sample output of the **debug cable mdd** command:

```
Router# debug cable mdd

CMTS mdd debugging is on
Router#
Jul 7 20:57:27.038: Cable8/0/0: size 228 mdd_tlv_size 198 num_frag 1 seq_num 1
test_mdd_tlv_length 0
Jul 7 20:57:27.038: Cable8/0/0 MDD datagram size 228, msg len 226, ehdr type_or_
len 208, tlv_size 198 max_pak_size 1518
Jul 7 20:57:27.038: MDD MESSAGE
Jul 7 20:57:27.038: FRAME HEADER
Jul 7 20:57:27.038: FC, MAC_PARM, LEN - 0xC2, 0x00, 0x00E2
Jul 7 20:57:27.038: MAC MANAGEMENT MESSAGE HEADER
Jul 7 20:57:27.038: DA, SA - 01E0.2F00.0001, 0014.F1E5.381
8
Jul 7 20:57:27.038: msg LEN - 0x00D0
Jul 7 20:57:27.038: DSAP, SSAP - 0, 0
Jul 7 20:57:27.038: control, version, type - 0x03, 0x04, 0x21
Jul 7 20:57:27.038: 0x00D0: 01 02 07 07 01 01 01 02 02 00 00 08 01 01 09 01

Jul 7 20:57:27.038: 0x00E0: 00 0C 01 01
Jul 7 20:57:35.038: Non-primary MDD from Cable8/0/0 to RFID 961:
Jul 7 20:57:35.038: message dump:
Jul 7 20:57:35.038: 0x0000: C2 00 00 1C 9C 24 01
E0 2F 00 00 01 00 14 F1 E5
Jul 7 20:57:35.038: 0x0010: 38 18 00 0A 00 00 03 04 21 00 01 01 01 62
Jul 7 20:57:35.038: Non-primary MDD from Cable8/0/0 to RFID 962:
Jul 7 20:57:35.038: message dump:
Jul 7 20:57:35.038: 0x0000: C2 00 00 1C 9C 24 01 E0 2F 00 00 01 00 14 F1 E5
Jul 7 20:57:35.038: 0x0010: 38 18 00 0A 00 00 03 04 21 00 01 01 01 63
Jul 7 20:57:35.038: Non-primary MDD from Cable8/0/0 to RFID 963:
Jul 7 20:57:35.038: message dump:
Jul 7 20:57:35.038: 0x0000: C2 00 00 1C 9C 24 01 E0 2F 00 00 01 00 14 F1 E5
Jul 7 20:57:35.038: 0x0010: 38 18 00 0A 00 00 03 04 21 00 01 01 01 64
```

**Related Commands**

| Command           | Description                                               |
|-------------------|-----------------------------------------------------------|
| debug cable md-sg | Displays the MAC domain service group debugging messages. |

# debug cable md-sg

To enable debugging information for MAC domain service group messages, use the **debug cable md-sg** command in privileged EXEC mode. To turn off debugging, use the **no** form of this command.

**debug cable md-sg**

**no debug cable md-sg**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                  |
|-----------------|-------------|---------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Examples** The following is a sample output of the **debug cable md-sg** command:

```
Router# debug cable md-sg
```

```
CMTS md-sg debugging is on
```

```
Router#
Jul 7 21:04:24.938: Ambiguity Resolution: B_INIT_RNG_REQ notified (us = 1).
Jul 7 21:04:24.938: Ambiguity Resolution Validate Candidate: (B_INIT_RNG_REQ) f
ound[1] uschan = 0x1, reachable = 0x1, failed = 0x0.
Jul 7 21:04:24.938: Ambiguity Resolution: Done (case 1 b_init) with sg_id = 1.
Jul 7 21:04:38.858: Ambiguity Resolution: B_INIT_RNG_REQ notified (us = 1).
Jul 7 21:04:38.858: Ambiguity Resolution Validate Candidate: (B_INIT_RNG_REQ) f
ound[1] uschan = 0x1, reachable = 0x1, failed = 0x0.
Jul 7 21:04:38.858: Ambiguity Resolution: Done (case 1 b_init) with sg_id = 1.
Jul 7 21:04:50.438: Ambiguity Resolution: B_INIT_RNG_REQ notified (us = 1).
Jul 7 21:04:50.438: Ambiguity Resolution Validate Candidate: (B_INIT_RNG_REQ) f
ound[1] uschan = 0x1, reachable = 0x1, failed = 0x0.
Jul 7 21:04:50.438: Ambiguity Resolution: Done (case 1 b_init) with sg_id = 1.
Jul 7 21:04:52.898: Ambiguity Resolution: B_INIT_RNG_REQ notified (us = 1).
Jul 7 21:04:52.898: Ambiguity Resolution Validate Candidate: (B_INIT_RNG_REQ) f
ound[1] uschan = 0x1, reachable = 0x1, failed = 0x0.
Jul 7 21:04:52.898: Ambiguity Resolution: Done (case 1 b_init) with sg_id = 1.
Jul 7 21:05:06.938: Ambiguity Resolution: B_INIT_RNG_REQ notified (us = 1).
Jul 7 21:05:06.938: Ambiguity Resolution Validate Candidate: (B_INIT_RNG_REQ) f
ound[1] uschan = 0x1, reachable = 0x1, failed = 0x0.
Jul 7 21:05:06.938: Ambiguity Resolution: Done (case 1 b_init) with sg_id = 1.
Jul 7 21:05:08.378: Ambiguity Resolution: B_INIT_RNG_REQ notified (us = 1).
Jul 7 21:05:08.378: Ambiguity Resolution Validate Candidate: (B_INIT_RNG_REQ) f
ound[1] uschan = 0x1, reachable = 0x1, failed = 0x0.
Jul 7 21:05:08.378: Ambiguity Resolution: Done (case 1 b_init) with sg_id = 1.
Jul 7 21:05:22.538: Ambiguity Resolution: B_INIT_RNG_REQ notified (us = 1).
Jul 7 21:05:22.538: Ambiguity Resolution Validate Candidate: (B_INIT_RNG_REQ) f
ound[1] uschan = 0x1, reachable = 0x1, failed = 0x0.
Jul 7 21:05:22.538: Ambiguity Resolution: Done (case 1 b_init) with sg_id = 1.
Jul 7 21:05:24.998: Ambiguity Resolution: B_INIT_RNG_REQ notified (us = 1).
Jul 7 21:05:24.998: Ambiguity Resolution Validate Candidate: (B_INIT_RNG_REQ) f
```

```
ound[1] uschan = 0x1, reachable = 0x1, failed = 0x0.
Jul 7 21:05:24.998: Ambiguity Resolution: Done (case 1 b_init) with sg_id = 1.
Jul 7 21:05:36.818: Ambiguity Resolution: B_INIT_RNG_REQ notified (us = 1).
Jul 7 21:05:36.818: Ambiguity Resolution Validate Candidate: (B_INIT_RNG_REQ) f
ound[1] uschan = 0x1, reachable = 0x1, failed = 0x0.
Jul 7 21:05:36.818: Ambiguity Resolution: Done (case 1 b_init) with sg_id = 1.
```

#### Related Commands

| Command                | Description                                               |
|------------------------|-----------------------------------------------------------|
| <b>debug cable mdd</b> | Displays debugging messages of the MAC domain descriptor. |

# debug cable multicast counter clear

To reset debugging of multicast counters, use the **debug cable multicast counter clear** command in privileged EXEC mode.

```
debug cable multicast counter clear {all | multicast-group-address | mac-address}
```

|                    |                                |                                    |
|--------------------|--------------------------------|------------------------------------|
| Syntax Description | <b>all</b>                     | Resets all debug counters.         |
|                    | <i>multicast-group-address</i> | IP address of the multicast group. |
|                    | <i>mac-address</i>             | MAC address of the cable modem.    |

Command Default    None

Command Modes    Privileged EXEC(#)

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.2(33)SCE    | This command was introduced. |

**Usage Guidelines**

When enabled, this debug command does not provide any debugging output for counter values. When you use this command to reset debug counters associated with a multicast group IP address or MAC address, the command does not return any debugging messages. You will have to use the **show cable multicast debug** command to verify the debug counters.

**Examples**

The following is a sample output of the **debug cable multicast counter clear** command with the keyword **all**:

```
Router# debug cable multicast counter clear all
```

All multicast debug counters cleared.

|                  |                                            |                                                                                                                          |
|------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Related Commands | <b>Command</b>                             | <b>Description</b>                                                                                                       |
|                  | <b>debug cable multicast counter start</b> | The Cisco CMTS router starts collecting multicast debug counters based on a particular multicast group or a cable modem. |
|                  | <b>debug cable multicast counter stop</b>  | The Cisco CMTS router stops collecting multicast debug counters.                                                         |
|                  | <b>show cable multicast debug</b>          | Displays information about debug counters.                                                                               |

# debug cable multicast counter start

To enable the Cisco CMTS router to start collecting multicast debug counters based on a particular multicast group or a cable modem, use the **debug cable multicast counter start** command in privileged EXEC mode.

**debug cable multicast counter start** {*multicast-group-address* | *mac-address*}

|                           |                                |                                    |
|---------------------------|--------------------------------|------------------------------------|
| <b>Syntax Description</b> | <i>multicast-group-address</i> | IP address of the multicast group. |
|                           | <i>mac-address</i>             | MAC address of the cable modem.    |

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

|                        |                |                              |
|------------------------|----------------|------------------------------|
| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|                        | 12.2(33)SCE    | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | When enabled, this debug command does not provide any debugging output or messages. You must use the <b>show cable multicast debug</b> command to verify the debug counters. If you want to verify multicast group specific or MAC specific debug counters, you must turn on debugging of multicast counters using the <b>debug cable multicast counter start</b> command before using the <b>show cable multicast debug</b> command. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                          |
|-----------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following is a sample output of the <b>debug cable multicast counter start</b> command on the Cisco uBR10012 router: |
|-----------------|--------------------------------------------------------------------------------------------------------------------------|

```
Router# debug cable multicast counter start 001a.c3ff.d41a
```

|                         |                                            |                                                                  |
|-------------------------|--------------------------------------------|------------------------------------------------------------------|
| <b>Related Commands</b> | <b>Command</b>                             | <b>Description</b>                                               |
|                         | <b>debug cable multicast counter clear</b> | Resets debugging of multicast counters.                          |
|                         | <b>debug cable multicast counter stop</b>  | The Cisco CMTS router stops collecting multicast debug counters. |
|                         | <b>show cable multicast debug</b>          | Displays information about debug counters.                       |

# debug cable multicast counter stop

To stop the Cisco CMTS router from collecting multicast debug counters, use the **debug cable multicast counter stop** command in privileged EXEC mode.

**debug cable multicast counter stop**

**Syntax Description**    This command has no arguments or keywords.

**Command Default**    None

**Command Modes**    Privileged EXEC(#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

**Usage Guidelines**    When enabled, this debug command does not provide any debugging output or messages. You must use the **show cable multicast debug** command to verify the debug counters.

**Examples**    The following is a sample output of the **debug cable multicast counter stop** command on the Cisco uBR10012 router:

```
Router# debug cable multicast counter stop
```

| Related Commands | Command                             | Description                                                                                                              |
|------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|                  | debug cable multicast counter clear | Resets debugging of multicast counters.                                                                                  |
|                  | debug cable multicast counter start | The Cisco CMTS router starts collecting multicast debug counters based on a particular multicast group or a cable modem. |
|                  | show cable multicast debug          | Displays information about debug counters.                                                                               |



# debug cable multicast forwarding

To display debugging messages about downstream forwarding interfaces for cable modems that are wideband online (w-online) and multicast quality of service (MQoS) enabled, use the **debug cable multicast forwarding** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

**debug cable multicast forwarding [verbose]**

**no debug cable multicast forwarding**

|                           |                |                                                                                                                                  |
|---------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>verbose</b> | (Optional) Enables debugging with verbose description that provides detailed information about downstream forwarding interfaces. |
|---------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------|

|                        |      |
|------------------------|------|
| <b>Command Default</b> | None |
|------------------------|------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | 12.2(33)SCE    | This command was introduced. |

|                         |                                                                                                                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | Ensure that you turn on this debug command in a controlled environment where not too many multicast requests are being handled by the Cisco CMTS router, because this debug command will log a lot of debugging messages. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                                                                                                                                       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following is a sample output of the <b>debug cable multicast forwarding</b> command that displays debugging messages about downstream forwarding interfaces for cable modems that are w-online with MQoS-enabled multicast requests on the Cisco uBR10012 router: |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Router# debug cable multicast forwarding
```

```
! IGMP join
```

```
04:01:03: MCAST DS: [N/A:230.4.4.4:N/A]: No broadcast forwarding interface available.
Looking for default forwarding interface
04:01:03: MCAST DS: Req Attr: 0x0 Forb Attr: 0x0 CM [001c.eaa5.06ce:20].
04:01:03: MCAST DS: [N/A:230.4.4.4:Wideband-Cable5/1/2:1]: Default Forwarding interface
found Checking for MQoS, if MQoS not configured use the default.
04:01:03: MCAST DS: [N/A:230.4.4.4:Wideband-Cable5/1/2:1]: CM [001c.eaa5.06ce]: No
attribute masks configured for GC [1], GQC [1], SC[2]
04:01:03: MCAST DS: [N/A:230.4.4.4:Wideband-Cable5/1/2:1]: CM [001c.eaa5.06ce]: Forwarding
Interface selected, Bundle [Bundle123]
04:01:03: MCAST DS: [N/A:230.4.4.4:N/A]: No broadcast forwarding interface available.
Looking for default forwarding interface
04:01:03: MCAST DS: Req Attr: 0x0 Forb Attr: 0x0 CM [001c.eaa5.06ce:20].
04:01:03: MCAST DS: [N/A:230.4.4.4:Wideband-Cable5/1/2:1]: Default Forwarding interface
found Checking for MQoS, if MQoS not configured use the default.
```

```

04:01:03: MCAST DS: [N/A:230.4.4.4:Wideband-Cable5/1/2:1]: CM [001c.eaa5.06ce]: No
attribute masks configured for GC [1], GQC [1], SC[2]
04:01:03: MCAST DS: [N/A:230.4.4.4:Wideband-Cable5/1/2:1]: CM [001c.eaa5.06ce]: Forwarding
Interface selected, Bundle [Bundle123]
.
.
.
! IGMP leave

04:04:00: MCAST DS: [N/A:230.4.4.4:N/A]: No broadcast forwarding interface available.
Looking for default forwarding interface
04:04:00: MCAST DS: Req Attr: 0x0 Forb Attr: 0x0 CM [001c.eaa5.06ce:20].
04:04:00: MCAST DS: [N/A:230.4.4.4:Wideband-Cable5/1/2:1]: Default Forwarding interface
found Checking for MQos, if MQos not configured use the default.
04:04:00: MCAST DS: [N/A:230.4.4.4:Wideband-Cable5/1/2:1]: CM [001c.eaa5.06ce]: No
attribute masks configured for GC [1], GQC [1], SC[2]
04:04:00: MCAST DS: [N/A:230.4.4.4:Wideband-Cable5/1/2:1]: CM [001c.eaa5.06ce]: Forwarding
Interface selected, Bundle [Bundle123]
.
.
.

```

The following is a sample output of the **debug cable multicast forwarding** command with the **verbose** option that provides information about the forwarding interface selection related to service flow attributes on the Cisco uBR10012 router:

```
Router# debug cable multicast forwarding verbose
```

```

*Jun 2 00:45:32.679 UTC: MCAST DS: [N/A:231.1.1.2:N/A]: No broadcast forwarding interface
available. Looking for default forwarding interface
*Jun 2 00:45:32.679 UTC: MCAST DS: Req Attr: 0x0 Forb Attr: 0x0 CM [001a.c3ff.d824:1].
*Jun 2 00:45:32.679 UTC: MCAST DS: [N/A:231.1.1.2:Wideband-Cable7/0/0:0]: Default
Forwarding interface found Checking for MQos, if MQos not configured use the default.
*Jun 2 00:45:32.679 UTC: MCAST DS: Req Attr: 0x800000F0 Forb Attr: 0x0 CM
[001a.c3ff.d824:1].
*Jun 2 00:45:32.679 UTC: MCAST DS: Checking interface [Wideband-Cable1/0/0:0] Attr:
0x8000000F, for CM [001a.c3ff.d824:1]
*Jun 2 00:45:32.679 UTC: MCAST DS: Checking interface [Wideband-Cable1/0/0:1] Attr:
0x80000000, for CM [001a.c3ff.d824:1]
*Jun 2 00:45:32.679 UTC: MCAST DS: Checking interface [Wideband-Cable1/0/0:2] Attr:
0x80000000, for CM [001a.c3ff.d824:1]
*Jun 2 00:45:32.679 UTC: MCAST DS: Checking interface [Wideband-Cable7/0/0:0] Attr:
0x80000000, for CM [001a.c3ff.d824:1]
*Jun 2 00:45:32.679 UTC: MCAST DS: Checking interface [Wideband-Cable7/0/0:2] Attr:
0x800000F0, for CM [001a.c3ff.d824:1]
*Jun 2 00:45:32.679 UTC: MCAST DS: Checking interface [Wideband-Cable7/0/1:0] Attr:
0x8000000F, for CM [001a.c3ff.d824:1]
*Jun 2 00:45:32.679 UTC: MCAST DS: Selected interface [Wideband-Cable7/0/0:2], for CM
[001a.c3ff.d824:1]
*Jun 2 00:45:32.679 UTC: MCAST DS: [N/A:231.1.1.2:Wideband-Cable7/0/0:2]: CM
[001a.c3ff.d824:1]: Picked interface after attribute matching
*Jun 2 00:46:07.991 UTC: MCAST DS: [N/A:230.1.1.1:N/A]: No broadcast forwarding interface
available. Looking for default forwarding interface
*Jun 2 00:46:07.991 UTC: MCAST DS: Req Attr: 0x0 Forb Attr: 0x0 CM [001a.c3ff.d824:1].
*Jun 2 00:46:07.991 UTC: MCAST DS: [N/A:230.1.1.1:Wideband-Cable7/0/0:0]: Default
Forwarding interface found Checking for MQos, if MQos not configured use the default.
*Jun 2 00:46:07.991 UTC: MCAST DS: Req Attr: 0x8000000F Forb Attr: 0x0 CM
[001a.c3ff.d824:1].
*Jun 2 00:46:07.991 UTC: MCAST DS: Checking interface [Wideband-Cable1/0/0:0] Attr:
0x8000000F, for CM [001a.c3ff.d824:1]
*Jun 2 00:46:07.991 UTC: MCAST DS: Checking interface [Wideband-Cable1/0/0:1] Attr:
0x80000000, for CM [001a.c3ff.d824:1]
*Jun 2 00:46:07.991 UTC: MCAST DS: Checking interface [Wideband-Cable1/0/0:2] Attr:
0x80000000, for CM [001a.c3ff.d824:1]

```

```
*Jun 2 00:46:07.991 UTC: MCAST DS: Checking interface [Wideband-Cable7/0/0:0] Attr:
0x80000000, for CM [001a.c3ff.d824:1]
*Jun 2 00:46:07.991 UTC: MCAST DS: Checking interface [Wideband-Cable7/0/0:2] Attr:
0x800000F0, for CM [001a.c3ff.d824:1]
*Jun 2 00:46:07.991 UTC: MCAST DS: Checking interface [Wideband-Cable7/0/1:0] Attr:
0x8000000F, for CM [001a.c3ff.d824:1]
*Jun 2 00:46:07.991 UTC: MCAST DS: Selected interface [Wideband-Cable7/0/1:0], for CM
[001a.c3ff.d824:1]
```

#### Related Commands

| Command                                    | Description                                                                                                              |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>debug cable multicast counter clear</b> | Resets debugging of multicast counters.                                                                                  |
| <b>debug cable multicast counter start</b> | The Cisco CMTS router starts collecting multicast debug counters based on a particular multicast group or a cable modem. |
| <b>debug cable multicast counter stop</b>  | The Cisco CMTS router stops collecting multicast debug counters.                                                         |
| <b>show cable multicast debug</b>          | Displays information about debug counters.                                                                               |

# debug cable multicast latency

To display debugging messages about multicast latency, use the **debug cable multicast latency** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

- debug cable multicast latency**
- no debug cable multicast latency**

**Syntax Description**    This command has no arguments or keywords.

**Command Default**    None

**Command Modes**    Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCE | This command was introduced. |

**Examples**    The following is a sample output of the **debug cable multicast latency** command that displays latency information related to IGMP and PCMM supported multicast sessions:

```
Router# debug cable multicast latency

! IGMP join

4:31:59 PM 00:35:53: MCAST LATENCY: Sending IPC RP->GUR for indices: Group 230.1.1.2
Source N/A sid 65535 RP-LC IPC flags 1 if_num 1832, mc_rfid 720, sfid 0, gcfgid 0, wb_chid
720 7/0/0
00:35:53: MCAST LATENCY: Indices received from Guardian for Group:230.1.1.2 Source:N/A
Bundle:Bundle1 Interface:Integrated-Cable7/0/0:0 Sid65535 StatIndex:23 KeyIndex:0

! IGMP leave

4:33:16 PM 00:37:22: MCAST LATENCY: Indices received from Guardian for Group:230.1.1.2
Source:N/A Bundle:Bundle1 Interface:Integrated-Cable7/0/0:0 Sid0 StatIndex:23 KeyIndex:0
```

The following is a sample output of the **debug cable multicast latency** command that displays latency information related to PCMM supported multicast sessions:

```
Router# debug cable multicast latency

! PCMM join

00:13:44: MCAST LATENCY: Sending IPC RP->GUR for indices: Group 230.1.1.1 Source N/A sid
65535 RP-LC IPC flags 1 if_num 1800, mc_rfid 0, sfid 0, gcfgid 0, wb_chid 1800 7/0/0
00:13:44: MCAST LATENCY: Sending IPC RP->GUR for indices: Group 230.1.1.1 Source N/A sid
8198 RP-LC IPC flags 1 if_num 1800, mc_rfid 0, sfid 0, gcfgid 1, wb_chid 1800 7/0/0
00:13:44: MCAST LATENCY: Group 230.1.1.1 Source N/A Sending to Guardian
WB:Wideband-Cable7/0/0:0 ID:1800 MCAST_SID:8198 ServiceClass:200 Flag:1 mqos_gc:1
```

```
00:13:44: MCAST LATENCY: Indices received from Guardian for Group:230.1.1.1 Source:N/A
Bundle:Bundle1 Interface:Wideband-Cable7/0/0:0 Sid65535 StatIndex:11 KeyIndex:0
00:13:44: MCAST LATENCY: Indices received from Guardian for Group:230.1.1.1 Source:N/A
Bundle:Bundle1 Interface:Wideband-Cable7/0/0:0 Sid8198 StatIndex:12 KeyIndex:0
00:10:25: MCAST LATENCY: Wideband-Cable7/0/0: IPC LC-RP CMTS_MQOS MCAST_SID 8198 SCLASS
200, DS_SFID 5, Flag 1

! PCMM leave

00:16:16: MCAST LATENCY: Indices received from Guardian for Group:230.1.1.1 Source:N/A
Bundle:Bundle1 Interface:Wideband-Cable7/0/0:0 Sid0 StatIndex:13 KeyIndex:0
00:16:16: MCAST LATENCY: Group N/A Source N/A Sending to Guardian WB:Wideband-Cable7/0/0:0
ID:1800 MCAST_SID:8199 ServiceClass:200 Flag:0 mqos_gc:1
```

#### Related Commands

| Command                                 | Description                                                                                                              |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>debug cable multicast forwarding</b> | Displays debugging messages about downstream forwarding interfaces for cable modems that are wideband online (w-online). |

# debug cable phs

To display the activities of the payload header suppression and restoration (PHS) driver, use the **debug cable phs** command in privileged EXEC mode. The **no** form of this command disables debugging output.

**debug cable phs**

**no debug cable phs**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

| Command History | Release    | Modification                                    |
|-----------------|------------|-------------------------------------------------|
|                 | 12.1(4)CX  | This command was introduced.                    |
|                 | 12.2(4)BC1 | Support was added to the Release 12.2 BC train. |

Usage Guidelines

Do not use this command when you have a large number of active CMs on your network, because it could generate a huge amount of output to the console port.

This command displays the output for both the upstream and downstream drivers. The upstream receive driver restores headers that have been suppressed by CMs, and the downstream driver suppresses specific fields in packet header before forwarding a frame to the CM.

Examples

The following example shows typical output from PHS debugging:

```
Router# debug cable phs
CMTS payload header suppression debugging is on

00:02:55: New PHS rule: 1 (SFID: 9)
 size : 34
 mask : 00 00 00 03 FC 00 00 00 field: 00 00 00 00 00 00 00 00
Add PHS rule 1 to CFR ID 1

00:02:57: New PHS rule: 1 (SFID: 11)
 size : 34
 mask : 00 00 00 03 FC 00 00 00 field: 00 00 00 00 00 00 00 00
Add PHS rule 1 to CFR ID 1
Router#
```

# debug cable phy

To activate debugging of messages generated in the cable physical layer, use the **debug cable phy** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cable phy**

**no debug cable phy**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3NA  | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command activates debugging of messages generated in the PHY system, which is the physical layer where upstream and downstream activity between the Cisco CMTS and the HFC network is controlled. When this command is activated, any messages generated in the PHY system are displayed on the Cisco CMTS console. |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                          |
|-----------------|--------------------------------------------------------------------------|
| <b>Examples</b> | The following is typical output from the <b>debug cable phy</b> command. |
|-----------------|--------------------------------------------------------------------------|

```
cmts_phy_init: mac_version == BCM3210_FPGA
bcm3033_set_tx_sym_rate(5056941)
stintctl = 0x54484800
bcm3033_set_tx_if_freq(44000000)
stfreqctl = 0x5BAAAAAA
cmts_phy_init_us: U0 part_id = 0x3136, rev_id = 0x05, rev_id2 = 0x64
cmts_phy_init: mac_version == BCM3210_FPGA
Media access controller chip version.
bcm3033_set_tx_sym_rate(5056941)
stintctl = 0x54484800
Physical layer symbol rate register value.
00:51:49: bcm3033_set_tx_if_freq(44000000)
00:51:49: stfreqctl = 0x5BAAAAAA
Physical layer intermediate frequency (IF) register value.
00:51:49: cmts_phy_init_us: U0 part_id = 0x3136, rev_id = 0x05, rev_id2 = 0x64
Physical layer receiver chip part version.
```

# debug cable privacy

To activate debugging of baseline privacy, use the **debug cable privacy** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

- debug cable privacy**
- no debug cable privacy**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3 XA | This command was introduced. |

**Usage Guidelines** This command activates debugging of the Baseline Privacy Interface (BPI) feature. When this command is activated, the BPI handler generates a debugging message whenever the BPI state changes or a BPI-related event occurs.



Tip

Debugging must be enabled for one or more cable interfaces, using the **debug cable interface** command, before the **debug cable privacy** command displays any output. BPI debugging can be done only on a per-interface basis, not on the basis of a CM’s MAC address.



Note

This command is supported only on images that support BPI or BPI+ encryption.

**Examples** The following is typical output from the **debug cable privacy** command:

```
02:32:08: CMTS Received AUTH REQ.
02:32:08: Created a new CM key for 0030.96f9.65d9.
02:32:08: CMTS generated AUTH_KEY.
02:32:08: Input : 70D158F106B0B75
02:32:08: Public Key:
02:32:08: 0x0000: 30 68 02 61 00 DA BA 93 3C E5 41 7C 20 2C D1 87
02:32:08: 0x0010: 3B 93 56 E1 35 7A FC 5E B7 E1 72 BA E6 A7 71 91
02:32:08: 0x0020: F4 68 CB 86 A8 18 FB A9 B4 DD 5F 21 B3 6A BE CE
02:32:08: 0x0030: 6A BE E1 32 A8 67 9A 34 E2 33 4A A4 0F 8C DB BD
02:32:08: 0x0040: D0 BB DE 54 39 05 B0 E0 F7 19 29 20 8C F9 3A 69
02:32:08: 0x0050: E4 51 C6 89 FB 8A 8E C6 01 22 02 34 C5 1F 87 F6
02:32:08: 0x0060: A3 1C 7E 67 9B 02 03 01 00 01
02:32:08: RSA public Key subject:
02:32:08: 0x0000: 30 7C 30 0D 06 09 2A 86 48 86 F7 0D 01 01 01 05
02:32:08: 0x0010: 00 03 6B 00 30 68 02 61 00 DA BA 93 3C E5 41 7C
02:32:08: 0x0020: 20 2C D1 87 3B 93 56 E1 35 7A FC 5E B7 E1 72 BA
02:32:08: 0x0030: E6 A7 71 91 F4 68 CB 86 A8 18 FB A9 B4 DD 5F 21
```



```

02:32:08: 0x0040: B3 6A BE CE 6A BE E1 32 A8 67 9A 34 E2 33 4A A4
02:32:08: 0x0050: 0F 8C DB BD D0 BB DE 54 39 05 B0 E0 F7 19 29 20
02:32:08: 0x0060: 8C F9 3A 69 E4 51 C6 89 FB 8A 8E C6 01 22 02 34
02:32:08: 0x0070: C5 1F 87 F6 A3 1C 7E 67 9B 02 03 01 00 01
02:32:08: RSA encryption result = 0
02:32:08: RSA encrypted output:
02:32:08: 0x0000: B6 CA 09 93 BF 2C 05 66 9D C5 AF 67 0F 64 2E 31
02:32:08: 0x0010: 67 E4 2A EA 82 3E F7 63 8F 01 73 10 14 4A 24 ED
02:32:08: 0x0020: 65 8F 59 D8 23 BC F3 A8 48 7D 1A 08 09 BF A3 A8
02:32:08: 0x0030: D6 D2 5B C4 A7 36 C4 A9 28 F0 6C 5D A1 3B 92 A2
02:32:08: 0x0040: BC 99 CC 1F C9 74 F9 FA 76 83 ED D5 26 B4 92 EE
02:32:08: 0x0050: DD EA 50 81 C6 29 43 4F 73 DA 56 C2 29 AF 05 53
02:32:08: CMTS sent AUTH response.
02:32:08: CMTS Received TEK REQ.
02:32:08: Created a new key for SID 2.
02:32:08: CMTS sent KEY response.

```

## Related Commands

| Command                      | Description                                                                                    |
|------------------------------|------------------------------------------------------------------------------------------------|
| <b>debug cable bpiatp</b>    | Displays debugging information about the BPI-related messages that the CMTS sends or receives. |
| <b>debug cable interface</b> | Enables debugging output for a specific cable interface.                                       |
| <b>debug cable keyman</b>    | Displays debugging information about BPI key management.                                       |

# debug cable qos

To activate quality-of-service (QoS) debugging, use the **debug cable qos** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

```
debug cable qos

no debug cable qos
```

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3NA  | This command was introduced. |

Usage Guidelines

This command activates debugging of QoS. When this command is activated, any messages related to QoS parameters are displayed on the Cisco CMTS console.

Examples

The following is typical output from the **debug cable qos** command:

CMTS\_QOS\_LOG\_NO\_MORE\_QOS\_INDEX
Modems cannot add more entries to the class of service table.
CMTS\_QOS\_LOG\_NOMORE\_QOSPRF\_MEM
Memory allocation error when creating class of service table entry.
CMTS\_QOS\_LOG\_NO\_CREATION\_ALLOWED
Class of service entry cannot be created by modem. Use CLI or SNMP
interface instead of the modem's TFTP configuration file.
CMTS\_QOS\_LOG\_CANNOT\_REGISTER\_COS\_SID
A service identifier (SID) could not be assigned to the registering modem.
CMTS\_QOS\_LOG\_CANNOT\_DEREGISTER\_COS\_SID
The modem's service identifier (SID) was already removed.
CMTS\_QOS\_LOG\_MSLLOT\_TIMEBASE\_WRAPPED
The 160 KHz timebase clock drives a 26-bit counter which wraps around
approximately every 7 minutes. This message is generated every time it
wraps around.

# debug cable range

To display ranging messages from CMs on the HFC network, use the **debug cable range** command in privileged EXEC mode. To disable debugging output, the **no** form of the command.

**debug cable range**

**no debug cable range**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3NA  | This command was introduced. |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command activates debugging of ranging messages from CMs on the HFC network. When this command is activated, any ranging messages generated when CMs request or change their upstream frequencies are displayed on the Cisco CMTS console. Use this command to display the details of the initial and station maintenance procedures. The initial maintenance procedure is used for link establishment. The station maintenance procedure is used for link keepalive monitoring. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                               |
|-----------------|-------------------------------------------------------------------------------|
| <b>Examples</b> | The following shows typical output from the <b>debug cable range</b> command. |
|-----------------|-------------------------------------------------------------------------------|

```
Got a ranging request
SID value is 0 on Interface Cable3/0/U0
CM mac address 00:10:7B:43:AA:21 Timing offset is 3312
3E 1E 3F FF 00 00 59 BF 01 15 F8 01 A7 00 0C F0
```

The following output shows typical output when a CM first seeks to establish a link to the Cisco CMTS. The service identifier (SID) value of 0 indicates that the modem has no assigned SID. The CM mac address is the MAC address of the modem's radio frequency (RF) interface, not its Ethernet interface. The Timing offset is a measure of the distance between the modem and the Cisco CMTS, expressed in 10.24 MHz clocks. This value is adjusted down to zero by the maintenance procedures. The first 16 bytes of the prepended header of the message are dumped in hexadecimal.

```
CM mac address 0010.7b43.aa21
found..Assigned SID #2 on Interface Cable3/0/U0
Timing offset is CF0
Power value is 15F8, or -1 dB
Freq Error = 423, Freq offset is 1692
Ranging Modem with Sid 2 on i/f : Cable3/0/U0
```

The following is typical output when the CM is first assigned a SID during initial maintenance:

```
Initial Range Message Received on Interface Cable3/0/U0
CMTS reusing old sid : 2 for modem : 0010.7b43.aa21
Timing offset is CF0
Power value is 15F8, or -1 dB
```

```
Freq Error = 423, Freq offset is 1692
Ranging Modem with Sid 2 on i/f : Cable3/0/U0
```

The following is typical output when the modem is reassigned the same SID during initial maintenance.

```
Ranging Modem with Sid 2 on i/f : Cable3/0/U0
```

```
Got a ranging request
SID value is 2 on Interface Cable3/0/U0
CM mac address 00:10:7B:43:AA:21
Timing offset is 0
Power value is 1823, or -1 dB
Freq Error = 13, Freq offset is 0
Ranging has been successful for SID 2 on Interface Cable3/0/U0
```

Output occurs when the modem is polled by the CMTS during station maintenance. Polling happens at a minimum rate of once every 10 seconds.

# debug cable receive

To display debug messages for messages received on the upstream from a CM, use the **debug cable receive** command in privileged EXEC mode. To stop displaying debug messages, use the **no** form of this command.

**debug cable receive**

**no debug cable receive**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

Privileged EXEC

## Command History

| Release              | Modification                 |
|----------------------|------------------------------|
| 12.0(7)XR            | This command was introduced. |
| 12.1(1)T, 12.1(2)EC1 | This command was disabled.   |
| 12.1(11b)EC          | This command was removed.    |

## Examples

The following command enables debugging of upstream messages:

```
router# debug cable receive
CMTS debug Rx debugging is on
```

The **debug cable receive** command was disabled in Cisco IOS Release 12.1 T, 12.1 EC, and later releases, although it still appears in the CLI until Cisco IOS Release 12.1(11b)EC. To monitor the packets received from the CMs, use the **debug ip packet** command instead.

Because the **debug ip packet** command produces a large volume of messages, you must use it together with an access list to restrict the messages to a particular CM or CPE device to avoid affecting system performance. For example, the following commands would set up an access list that monitors all traffic being sent between the hosts with the two specified IP addresses:

```
router# configure terminal
router(config)# access-list 150 permit ip host ip-address-1 host ip-address-2
router(config)# access-list 150 permit ip host ip-address-2 host ip-address-1
router(config)# exit
router# debug ip packet 150 detail
```

## Related Commands

| Command                     | Description                                                             |
|-----------------------------|-------------------------------------------------------------------------|
| <b>debug cable transmit</b> | Enables debugging for transmitted packets.                              |
| <b>debug ip packet</b>      | Enables debugging of IP packets received and transmitted by the router. |

# debug cable registration

To display debug messages for the CM registration process, use the **debug cable registration** command in privileged EXEC mode. To stop displaying debug messages, use the **no** form of this command.

**debug cable registration**

**no debug cable registration**

**Syntax Description**    This command has no arguments or keywords.

**Command Modes**    Privileged EXEC

| Command History | Release   | Modification                 |
|-----------------|-----------|------------------------------|
|                 | 12.0(7)XR | This command was introduced. |

**Usage Guidelines**    The **debug cable registration** command displays messages about the registration request and response messages sent and received by the CMTS when a CM initiates the DOCSIS registration process. To see the relevant messages, you must also enable debugging for a particular interface or CM using the **debug cable interface** or **debug cable mac-address** commands.

**Examples**    The following shows typical debugging output from a registration process:

```
router# debug cable interface c3/0 verbose
router# debug cable registration
CMTS registration debugging is on

Jul 4 14:31:37.471: Registration request from 0001.9659.3ef7, SID 3 on Cable3/0/U2
Jul 4 14:31:37.471: Found a network access control parameter
Jul 4 14:31:37.471: The Ntw Access Control is 1
Jul 4 14:31:37.475: This TLV is GOOD
Jul 4 14:31:37.475: Found a class of service block
Jul 4 14:31:37.475: The CLASS ID : 5
Jul 4 14:31:37.475: The MAX DS RATE : 3000000
Jul 4 14:31:37.475: The MAX US RATE : 2000000
Jul 4 14:31:37.475: This TLV is GOOD
Jul 4 14:31:37.475: Found vendor extensions
Jul 4 14:31:37.475: Cisco Vendor ID Field found(ok)
Jul 4 14:31:37.475: No. of requested phone lines is 2
Jul 4 14:31:37.475: This TLV is GOOD
Jul 4 14:31:37.475: Found vendor extensions
Jul 4 14:31:37.475: Cisco Vendor ID Field found(ok)
Jul 4 14:31:37.475: IP precedence specific subtype found
Jul 4 14:31:37.475: IP Precedence value: 0 Rate Limit: 10000
Jul 4 14:31:37.475: This TLV is GOOD
Jul 4 14:31:37.475: Found Max CPE
Jul 4 14:31:37.475: The Max CPE is 10
Jul 4 14:31:37.475: This TLV is GOOD
Jul 4 14:31:37.475: Found CM MIC
Jul 4 14:31:37.475: CM Mic: 5A D5 58 DC E8 2B 5B 24 6E 4E 69 84 17 B9 AB 36
```

```

Jul 4 14:31:37.475: This TLV is GOOD
Jul 4 14:31:37.475: Found CMTS MIC
Jul 4 14:31:37.475: CMTS Mic: A7 E4 15 6 F9 2F BA 81 FE 22 E4 92 5F 81 D4 BB
Jul 4 14:31:37.475: This TLV is GOOD
Jul 4 14:31:37.475: Found modem ip
Jul 4 14:31:37.475: The modem ip value is 10.200.69.90
Jul 4 14:31:37.475: This TLV is GOOD
Jul 4 14:31:37.475: Found modem capabilities
Jul 4 14:31:37.475: Modem Caps Length is 18
Jul 4 14:31:37.475: Modem Caps values:
Jul 4 14:31:37.475: 0x0000: 01 01 01 02 01 00 03 01 00 04 01 00 05 01 00 06
Jul 4 14:31:37.475: 0x0010: 01 00
Jul 4 14:31:37.475: Concatenation is on for this CM
Jul 4 14:31:37.475: Unknown capability type 2: Ignored
Jul 4 14:31:37.475: Unknown capability type 3: Ignored
Jul 4 14:31:37.475: Unknown capability type 4: Ignored
Jul 4 14:31:37.475: Unknown capability type 5: Ignored
Jul 4 14:31:37.475: Unknown capability type 6: Ignored
Jul 4 14:31:37.475: This TLV is GOOD
Jul 4 14:31:37.475: Finished parsing REG Request
Jul 4 14:31:37.475: Sec sids obtained for all requested classes of service
Jul 4 14:31:37.475: Performing connection admission control (CAC) for each Sid
Jul 4 14:31:37.475: CAC Status for ClassID:5 is CAC_SUCCESS
Jul 4 14:31:37.475: Building a GOOD REG-RSP
Jul 4 14:31:37.475: Adding Modem Caps to the Response to REG RSP
Jul 4 14:31:37.475: Registration Status: ok (0)
Jul 4 14:31:37.475: ClassId:5 assigned QoS Sid:3
Jul 4 14:31:37.475: Adding Service Class Data TLV:
Jul 4 14:31:37.475: 0x0000: 01 07 01 01 05 02 02 00 03
Jul 4 14:31:37.475: Adding Modem Caps to Response:
Jul 4 14:31:37.475: 0x0000: 05 03 01 01 01
Jul 4 14:31:37.475: Registration Response:
Jul 4 14:31:37.475: 0x0000: C2 00 00 29 00 00 00 01 96 59 3E F7 00 30 7B F9
Jul 4 14:31:37.475: 0x0010: 40 54 00 17 00 00 03 01 07 00 00 03 00 01 07 01
Jul 4 14:31:37.479: 0x0020: 01 05 02 02 00 03 05 03 01 01 01
Jul 4 14:31:37.479: Registration Response Transmitted

```

The following example shows what can occasionally occur when a shared secret has been implemented. Some CMs calculate the MD5 Message Integrity Check (MIC) over the length of the registration TLV parameters as well as the length of the shared secret itself, while other CMS calculate the MIC value only over the length of the registration TLV parameters. The Cisco CMTS attempts to verify the MIC and shared secret values using the first technique, and if that fails, the CMTS then uses the second technique to verify the CM.

```

Jun 28 12:17:36.171: Registration request from 00c0.abcd.ef01, SID 58 on Cable5/0/U0
Jun 28 12:17:36.171: Found Network Access TLV
Jun 28 12:17:36.171: Found Class Of Service TLV Block
Jun 28 12:17:36.171: Found Max CPEs TLV
Jun 28 12:17:36.171: Found TFTP Server Provisioned CM Address TLV
Jun 28 12:17:36.171: Found CM-MIC TLV
Jun 28 12:17:36.171: Found CMTS-MIC TLV
Jun 28 12:17:36.171: Found Modem Capabilities TLV
Jun 28 12:17:36.171: Found CM IP Address TLV
Jun 28 12:17:36.171: Computing CMTS-MIC to validate REG-REQ data.
Jun 28 12:17:36.171: CMTS_MIC(rfc2104) failed text + key
Jun 28 12:17:36.171: CMTS_MIC(rfc2104) passed
Jun 28 12:17:36.171: REG-RSP Status : ok (0)
Jun 28 12:17:36.171: Registration Response Transmitted

```

The following example shows typical output when a CM attempts to come online without downloading a DOCSIS configuration file from a TFTP server through the Cisco CMTS cable interface, when the **cable tftp-enforce** command has been used.

```
Router# debug cable interface c3/0 verbose
Router# debug cable registration
CMTS registration debugging is on

May 14 22:33:21.474: Registration request from 5555.7366.12fb, SID 2 on Cable3/0/U0
May 14 22:33:21.474: Cable Modem sent Registration Request without attempting TFTP

SLOT 3/0: May 14 22:33:21.474: %UBR7200-4-REGISTRATION_BEFORE_TFTP:
<133>CMTS[Cisco]:<???????> Registration request unexpected: Cable Modem did not attempt
TFTP. CM Mac Addr <5555.7366.12fb>
Registration failed for Cable Modem 5555.7366.12fb on interface Cable3/0/U0:
 CoS/Sflow/Cfr/PHS failed in REG-REQ
May 14 22:33:21.474: REG-RSP Status : failure (2)
May 14 22:33:21.474: Registration Response:
May 14 22:33:21.474: 0x0000: C2 00 00 1B 00 00 00 50 73 4E B4 19 00 05 00 E0
May 14 22:33:21.474: 0x0010: 56 AC 00 09 00 00 03 01 07 00 00 02 02
May 14 22:33:21.474: Registration Response Transmitted
```



Tip

To monitor a specific CM when it comes online, use the **debug cable mac-address**, **debug cable mac-protocol**, and **debug cable registration** commands.

Related Commands

| Command                          | Description                                                                             |
|----------------------------------|-----------------------------------------------------------------------------------------|
| <b>debug cable interface</b>     | Enables debugging output for a specific cable interface.                                |
| <b>debug cable mac-protocol</b>  | Displays debugging output for the MAC layer protocol.                                   |
| <b>debug cable mac-scheduler</b> | Displays debugging output for the MAC layer scheduler and admission control activities. |
| <b>show controllers cable</b>    | Displays interface controller information for the specified slot.                       |



# debug cable remote-query

To display debug messages for remote modem queries, use the **debug cable remote-query** command in privileged EXEC mode. To stop displaying debug messages, use the **no** form of this command.

**debug cable remote-query**

**no debug cable remote-query**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| Command History | Release             | Modification                                             |
|-----------------|---------------------|----------------------------------------------------------|
|                 | 12.0(7)XR, 12.1(2)T | This command was introduced.                             |
|                 | 12.1(2)EC1          | Support for this command was added to the 12.1 EC train. |
|                 | 12.2(4)BC1b         | Support for this command was added to the 12.2 BC train. |

|                 |                                                                                        |
|-----------------|----------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows typical debugging output for a successful poll of the CMs: |
|-----------------|----------------------------------------------------------------------------------------|

```
router# debug cable remote-query
remote-query debugging is on
.
For IP address 209.165.200.223
Nov 10 15:56:50.241: docsIfSignalQualityEntry.5.4 = 380
Nov 10 15:56:50.241: docsIfMibObjects.2.2.1.3.2 = 360
Nov 10 15:56:50.245: docsIfDownstreamChannelEntry.6.4 = -30
Nov 10 15:56:50.245: docsIfUpstreamChannelEntry.6.3 = 12422
Nov 10 15:56:50.249: docsIfSignalQualityEntry.6.4 = 0
Nov 10 15:56:50.477:
```

The following example shows typical debugging output when the waiting queue at the CMTS is empty:

```
SNMP proxy exec got event, but queue is empty
```

The following example shows typical debugging output when you try to modify the polling interval or community string while the polling in is progress:

```
Community string if modified will not be reflected
```



|             |                                                                                                                                                                                          |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | The polling interval will be changed but to change the community string, you must unconfigure the <b>snmp-server community</b> command and reconfigure it with the new community string. |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command                               | Description                                                                                      |
|------------------|---------------------------------------|--------------------------------------------------------------------------------------------------|
|                  | <b>cable modem remote-query</b>       | Enables and configures the remote-query feature to gather CM performance statistics on the CMTS. |
|                  | <b>show cable modem remote-query</b>  | Displays the statistics accumulated by the remote-query feature.                                 |
|                  | <b>snmp-server enable traps cable</b> | Enables traps that are sent when the remote polling of CMs has been completed.                   |

# debug cable reset

To display debugging messages when cable interfaces are reset due to the complete loss of received packets, use the **debug cable reset** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable reset**

**no debug cable reset**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3NA  | This command was introduced. |

|                         |                                                                         |
|-------------------------|-------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command activates display of reset messages from cable interfaces. |
|-------------------------|-------------------------------------------------------------------------|

|                 |                                                                               |
|-----------------|-------------------------------------------------------------------------------|
| <b>Examples</b> | The following shows typical output from the <b>debug cable reset</b> command: |
|-----------------|-------------------------------------------------------------------------------|

```
Router# debug cable reset
CMTS reset debugging is on
Router#
```

```
Resetting CMTS interface. Num SIDs = 32 Ranging count = 10
Elapsed time: 21 seconds
```

# debug cable rfmib

To display debugging messages about when the DOCSIS-IF-MIB MIB is updated, use the **debug cable rfmib** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable rfmib**

**no debug cable rfmib**

**Syntax Description**    This command has no arguments or keywords.

**Command Modes**    Privileged EXEC

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(15)BC1 | This command was introduced. |

**Usage Guidelines**    This command displays debugging messages when the counters in the DOCSIS-IF-MIB are updated.



**Note**

For more information about the information displayed by this command, see [RFC 2670](#) and the DOCS-IF-MIB MIB at the following URL:

<http://www.cisco.com/go/mibs>

**Examples**    The following shows typical output from the **debug cable rfmib** command:

```
Router# debug cable rfmib
CMTS RFMIB debugging is on
Router#

CMTS is calculating utilization.

Calculating all utilization data.

Polling and calculating all channels utilization data.

Polling and calculating all channels utilization data.

Cable7/0/0 DS
cur_snmp_ifOutOctets 29282580
cur_snmp_total_bytes 3348841605
last_snmp_ifOutOctets 27327636
last_snmp_total_bytes 3126121018
Cable7/0/0 DS, delta_outoctets 1954944, delta_total_bytes 222720587, chan_utilization 1

Cable7/0/0 US 2
cur_snmp_total_ms 36065552
cur_snmp_ucast_grnt_ms 11287
```

```
cur_snmp_used_cntn_ms 1238
last_snmp_total_ms 33665428
last_snmp_ucast_grnt_ms 10807
last_snmp_used_cntn_ms 1238
Cable7/0/0 US 2 delta_total_ms 2400124, delta_ucast_grnt_ms 480, delta_used_cntn_ms 0,
chan_utilization 0
```

# debug cable service-ds-selection

To enable the debugging for downstream selection, use the **debug cable service** command in privileged EXEC mode. To disable debugging for downstream-selection, use the **no** form of the command.

```
debug cable service-ds-selection {event|timer}

no debug cable service {event|timer}
```

| Syntax Description | event | Enables debug messages for Cable downstream selection events. |
|--------------------|-------|---------------------------------------------------------------|
|                    | timer | Enables debug messages for Cable downstream selection timer.  |

| Command Default | No debug messages for downstream selection are enabled. |
|-----------------|---------------------------------------------------------|
|-----------------|---------------------------------------------------------|

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | Release    | Modification                                               |
|-----------------|------------|------------------------------------------------------------|
|                 | 12.3(23)BC | This command was introduced for the Cisco uBR10012 router. |

| Usage Guidelines | The <b>debug cable service</b> command is intended for use by Cisco Systems technical support personnel. |
|------------------|----------------------------------------------------------------------------------------------------------|
|------------------|----------------------------------------------------------------------------------------------------------|

| Examples | <p>The following example shows how to enable debugging for downstream selection events:</p> <pre>Router debug cable service-ds-selection event</pre> |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------|

| Related Commands | Command          | Description                                                                                             |
|------------------|------------------|---------------------------------------------------------------------------------------------------------|
|                  | test cable voice | Manually set voice tag of a cable modem to test downstream channel selection for a voice-enabled modem. |

# debug cable specmgmt

To debug spectrum management (frequency agility) on the HFC network, use the **debug cable specmgmt** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable specmgmt**

**no debug cable specmgmt**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release   | Modification                                                                         |
|-----------------|-----------|--------------------------------------------------------------------------------------|
|                 | 11.3NA    | This command was introduced.                                                         |
|                 | 12.0(4)XI | This command was removed and replaced by the <b>debug cable hw-spectrum</b> command. |

**Usage Guidelines** This command activates debugging of spectrum management (frequency agility) on the HFC network. When this command is activated, any messages generated due to spectrum group activity will be displayed on the Cisco CMTS console. Spectrum group activity can be additions or changes to spectrum groups, or frequency and power level changes controlled by spectrum groups.

**Examples** The following shows sample output from the **debug cable specmgmt** command:

```
Router# debug cable specmgmt
CMTS specmgmt debugging is on
Router#
reassign-blind: U0 not present or shutdown
```

# debug cable startalloc

To debug channel allocations on the HFC network, use the **debug cable startalloc** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

- debug cable startalloc**
- no debug cable startalloc**

**Syntax Description**    This command has no arguments or keywords.

**Command Modes**    Privileged EXEC

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3NA  | This command was introduced. |

**Usage Guidelines**    This command activates debugging of the channel allocations on the HFC network. When this command is activated, any messages generated when channels are allocated to CMs on the HFC network are displayed on the Cisco CMTS console.

  
**Caution**

This command should be used for development testing only, not in production setting.

**Examples**    The following shows sample output from the **debug cable startalloc** command:

```
Router# debug cable startalloc
Router#
00:53:27: Cable3/U0 MAP startalloc adjusted by 1 mslots
00:53:27: Cable4/U0 MAP startalloc adjusted by 3 mslots
00:53:27: Cable3/U0 MAP startalloc adjusted by 5 mslots
00:53:27: Cable4/U0 MAP startalloc adjusted by 4 mslots
00:53:28: Cable3/U0 MAP startalloc adjusted by 4 mslots
00:53:28: Cable4/U0 MAP startalloc adjusted by 5 mslots
```



# debug cable subscriber-monitoring

To display enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers, use the **debug cable subscriber-monitoring** command in privileged EXEC mode. To stop the display of debug messages, use the **no** form of this command.

**debug cable subscriber-monitoring**

**no debug cable subscriber-monitoring**

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.2(15)BC1 | This command was introduced.                                    |
|                 | 12.3(9a)BC  | This command was integrated into Cisco IOS Release 12.3(9a)BC.  |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |
|                 |             | Support for the Cisco uBR7225VXR router was added.              |

**Usage Guidelines** Because this command can produce a large volume of debug information, use this command only when you have also enabled debugging for a particular interface or MAC address, using the **debug cable interface** and **debug cable mac-address** commands, respectively.

**Examples** The following example shows how to enable debugging output using the **debug cable subscriber-monitoring** command:

```
Router# debug cable subscriber-monitoring

subscriber monitoring debugging is on

cmts_enf_map_sm_to_qos: enforced=9, penalty_life_time=10080
cmts_enf_map_sm_to_qos: Found rule #=9, rule_name=name, dir=US
cmts_enf_map_sm_to_registered_qos1: us smp=0x00, ds smp=0x1F
```

| Related Commands | Command                       | Description                                                                                                                               |
|------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable qos enforce-rule</b> | Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode. |
|                  | <b>debug cable interface</b>  | Enables debugging output for a specific cable interface.                                                                                  |

| Command                                | Description                                                                                                        |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>debug cable<br/>mac-address</b>     | Enables debugging output for the cable modems that match the specified hardware MAC address or range of addresses. |
| <b>show cable qos<br/>enforce-rule</b> | Displays the QoS enforce-rules that are currently defined.                                                         |

# debug cable telco-return

To display debug messages for telco-return events, use the **debug cable telco-return** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable telco-return**

**no debug cable telco-return**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release   | Modification                 |
|-----------------|-----------|------------------------------|
|                 | 12.0(4)XI | This command was introduced. |

**Usage Guidelines** This command is supported only in images that support telco-return operation (-t-).

**Examples** The following is sample output from the **debug cable telco-return** and **debug cable telco-return msg** commands:

```
Router# debug cable telco-return
Router# debug cable telco-return msg
01:17:31:Sending TCD message:
 TLV type = 1
 TLV len = 56
 Factory default flag: 1
 Phone number 1: 5551212
 Service provider name:uBR7246
 Connection threshold: 10
 Username: guest
 Password: password
 DHCP authenticate: 1
 DHCP server: 10.10.255.255
 PPP authentication: 2
 Manual dial: 1
Sending TSI message:
 DS channel IP address: 10.10.10.10
 Registration IP address:10.10.10.10
 CMTS boot time: 3080626752
 DS channel ID: 0
 Epoch: 1
```

| Related Commands | Command                             | Description                                                                                        |
|------------------|-------------------------------------|----------------------------------------------------------------------------------------------------|
|                  | <b>debug cable telco-return msg</b> | Displays the Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages. |

# debug cable telco-return msg

To display the Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages that are sent downstream to the telco-return CMs, use the **debug cable telco-return msg** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable telco-return msg**

**no debug cable telco-return msg**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release   | Modification                 |
|-----------------|-----------|------------------------------|
|                 | 12.0(4)XI | This command was introduced. |

**Usage Guidelines** This command is supported only in images that support telco-return operation (-t-).

**Examples** The following is sample output from the **debug cable telco-return msg** command:

```
Router# debug cable telco-return
Router# debug cable telco-return msg
01:17:31:Sending TCD message:
 TLV type = 1
 TLV len = 56
 Factory default flag: 1
 Phone number 1: 5551212
 Service provider name:uBR7246
 Connection threshold: 10
 Username: guest
 Password: password
 DHCP authenticate: 1
 DHCP server: 10.10.255.255
 PPP authentication: 2
 Manual dial: 1
Sending TSI message:
 DS channel IP address: 10.10.10.10
 Registration IP address:10.10.10.10
 CMTS boot time: 3080626752
 DS channel ID: 0
 Epoch: 1
```

| Related Commands | Command                  | Description                                      |
|------------------|--------------------------|--------------------------------------------------|
|                  | debug cable telco-return | Displays debug messages for telco-return events. |

# debug cable tlvs

To display the Type/Length/Value encodings (TLVs) parsed by the DOCSIS 1.1 TLV parser/encoder, use the **debug cable tlvs** command in privileged EXEC mode. The **no** form of this command disables debugging output.

**debug cable tlvs**

**no debug cable tlvs**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                                                                                           |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------|
|                 | 12.1(4)CX   | This command was introduced.                                                                           |
|                 | 12.2(4)BC1  | This command was supported on the Cisco uBR7100 series and Cisco uBR10012 universal broadband routers. |
|                 | 12.2(33)SCC | This command was integrated into Cisco IOS Release 12.2(33)SCC.                                        |

**Usage Guidelines** This command displays the TLVs for service flow encodings, classifier encodings, and PHS rules. Do not use this command when you have a large number of active CMs on your network because it could generate a huge amount of output to the console port.

**Examples** The following example shows typical output for the **debug cable tlvs** command:

```
Router# debug cable tlvs
CMTS TLV encodings debugging is on

00:02:06: Registration request from 0003.e350.9b8d, SID 3 on Cable3/0/U0
00:02:06: TLV-Block Bytes:
00:02:06: 0x0000: 03 01 01 12 01 10 1D 01 00 16 0F 01 01 01 03 02
00:02:06: 0x0010: 00 04 09 06 03 04 0A 0A 00 02 18 07 01 02 00 01
00:02:06: 0x0020: 06 01 07 18 07 01 02 00 02 06 01 07 18 07 01 02
00:02:06: 0x0030: 00 03 06 01 01 18 07 01 02 00 04 06 01 01 19 07
00:02:06: 0x0040: 01 02 00 09 06 01 07 19 07 01 02 00 0A 06 01 01
00:02:06: 0x0050: 19 07 01 02 00 0B 06 01 01 19 07 01 02 00 0C 06
00:02:06: 0x0060: 01 01 06 10 33 E0 BA 7A DA 81 1B 9B 8E 37 F5 33
00:02:06: 0x0070: 1C 84 E7 4D 07 10 01 0C C8 DB F9 26 B7 D2 DD 0A
00:02:06: 0x0080: 00 58 1E 14 15 FD 0C 04 0A 0A 00 02 08 03 00 03
00:02:06: 0x0090: E3 05 21 02 01 01 03 01 01 04 01 01 05 01 00 06
00:02:06: 0x00A0: 01 01 07 01 00 08 01 04 09 01 00 0A 01 01 0B 01
00:02:06: 0x00B0: 08 01 01 01
00:02:06: Found Network Access TLV
00:02:06: Ntw Access Control : 1
00:02:06: Found Max CPEs TLV
00:02:06: Maximum Number Of CPEs : 16
00:02:06: Found Privacy Enable TLV
00:02:06: Privacy Enable : 0
```

```

00:02:06: Found Upstream Packet Classifier TLV
00:02:06: Classifier Reference : 1
00:02:06: Service-Flow Reference : 4
00:02:06: Found IP Packet Classifier Sub-TLV
00:02:06: Source Address : 10.10.0.2
00:02:06: Found Upstream Service Flow TLV
00:02:06: Service Flow Reference : 1
00:02:06: QoS Parameter Set Type : 0x7
00:02:06: Found Upstream Service Flow TLV
00:02:06: Service Flow Reference : 2
00:02:06: QoS Parameter Set Type : 0x7
00:02:06: Found Upstream Service Flow TLV
00:02:06: Service Flow Reference : 3
00:02:06: QoS Parameter Set Type : 0x1
00:02:06: Found Upstream Service Flow TLV
00:02:06: Service Flow Reference : 4
00:02:06: QoS Parameter Set Type : 0x1
00:02:06: Found Downstream Service Flow TLV
00:02:06: Service Flow Reference : 9
00:02:06: QoS Parameter Set Type : 0x7
00:02:06: Found Downstream Service Flow TLV
00:02:06: Service Flow Reference : 10
00:02:06: QoS Parameter Set Type : 0x1
00:02:06: Found Downstream Service Flow TLV
00:02:06: Service Flow Reference : 11
00:02:06: QoS Parameter Set Type : 0x1
00:02:06: Found Downstream Service Flow TLV
00:02:06: Service Flow Reference : 12
00:02:06: QoS Parameter Set Type : 0x1
00:02:06: Found CM-MIC TLV
00:02:06: CM MIC:
00:02:06: 0x0000: 33 E0 BA 7A DA 81 1B 9B 8E 37 F5 33 1C 84 E7 4D
00:02:06: Found CMTS-MIC TLV
00:02:06: CMTS MIC:
00:02:06: 0x0000: 01 0C C8 DB F9 26 B7 D2 DD 0A 00 58 1E 14 15 FD
00:02:06: Found CM IP Address TLV
00:02:06: Modem IP Address : 10.10.0.2
00:02:06: Vendor Id:
00:02:06: 0x0000: 00 03 E3
00:02:06: Found Modem Capabilities TLV
00:02:06: DOCSIS Version : 1
00:02:06: Fragmentation Support : 1
00:02:06: Payload Header Suppression Support : 1
00:02:06: IGMP Support : 0
00:02:06: Privacy Support : 1
00:02:06: Downstream SAID Support : 0
00:02:06: Upstream SID Support : 4
00:02:06: Optional Filtering Support : 0
00:02:06: Tx Equalizer Taps Per Symbol : 1
00:02:06: Tx Equalizer Taps Support : 8
00:02:06: Concatenation Support : 1
00:02:06: Performing admission control check
00:02:06: Added Modem Capabilities TLV:
00:02:06: 0x0000: 05 21 02 01 01 03 01 01 04 01 01 05 01 00 06 01
00:02:06: 0x0010: 01 07 01 00 08 01 04 09 01 00 0A 01 01 0B 01 08
00:02:06: 0x0020: 01 01 01
00:02:06: Sfref = 1, SFID = 7
00:02:06: Added Service Flow Parameters TLV:
00:02:06: 0x0000: 18 11 01 02 00 01 02 04 00 00 00 07 03 02 00 03
00:02:06: 0x0010: 06 01 07
00:02:06: Sfref = 2, SFID = 43
00:02:06: Added Service Flow Parameters TLV:
00:02:06: 0x0000: 18 11 01 02 00 02 02 04 00 00 00 2B 03 02 00 0B
00:02:06: 0x0010: 06 01 07

```

```

00:02:06: Sfref = 3, SFID = 44
00:02:06: Added Service Flow Parameters TLV:
00:02:06: 0x0000: 18 0D 01 02 00 03 02 04 00 00 00 2C 06 01 01
00:02:06: Sfref = 4, SFID = 45
00:02:06: Added Service Flow Parameters TLV:
00:02:06: 0x0000: 18 0D 01 02 00 04 02 04 00 00 00 2D 06 01 01
00:02:06: Sfref = 9, SFID = 8
00:02:06: Added Service Flow Parameters TLV:
00:02:06: 0x0000: 19 0D 01 02 00 09 02 04 00 00 00 08 06 01 07
00:02:06: Sfref = 10, SFID = 46
00:02:06: Added Service Flow Parameters TLV:
00:02:06: 0x0000: 19 0D 01 02 00 0A 02 04 00 00 00 2E 06 01 01
00:02:06: Sfref = 11, SFID = 47
00:02:06: Added Service Flow Parameters TLV:
00:02:06: 0x0000: 19 0D 01 02 00 0B 02 04 00 00 00 2F 06 01 01
00:02:06: Sfref = 12, SFID = 48
00:02:06: Added Service Flow Parameters TLV:
00:02:06: 0x0000: 19 0D 01 02 00 0C 02 04 00 00 00 30 06 01 01
00:02:06: Cfr-ref = 1, CFID = 1, SF-ref 4, SFID 45
00:02:06: Added Classifier Parameters TLV:
00:02:06: 0x0000: 16 19 01 01 01 03 02 00 04 02 02 00 01 04 04 00
00:02:06: 0x0010: 00 00 2D 09 06 03 04 0A 0A 00 02
00:02:06: REG-RSP Status : ok (0), REG-ACK required from CM (0)
00:02:06: Reg-Ack wait state successfully created
00:02:06: Registration Response:
00:02:06: 0x0000: C2 00 00 D9 00 00 00 03 E3 50 9B 8D 00 00 00 00
00:02:06: 0x0010: 30 30 00 C7 00 00 03 01 07 00 00 03 00 05 21 02
00:02:06: 0x0020: 01 01 03 01 01 04 01 01 05 01 00 06 01 01 07 01
00:02:06: 0x0030: 00 08 01 04 09 01 00 0A 01 01 0B 01 08 01 01 01
00:02:06: 0x0040: 18 11 01 02 00 01 02 04 00 00 00 07 03 02 00 03
00:02:06: 0x0050: 06 01 07 18 11 01 02 00 02 02 04 00 00 00 2B 03
00:02:06: 0x0060: 02 00 0B 06 01 07 18 0D 01 02 00 03 02 04 00 00
00:02:06: 0x0070: 00 2C 06 01 01 18 0D 01 02 00 04 02 04 00 00 00
00:02:06: 0x0080: 2D 06 01 01 19 0D 01 02 00 09 02 04 00 00 00 08
00:02:06: 0x0090: 06 01 07 19 0D 01 02 00 0A 02 04 00 00 00 2E 06
00:02:06: 0x00A0: 01 01 19 0D 01 02 00 0B 02 04 00 00 00 2F 06 01
00:02:06: 0x00B0: 01 19 0D 01 02 00 0C 02 04 00 00 00 30 06 01 01
00:02:06: 0x00C0: 16 19 01 01 01 03 02 00 04 02 02 00 01 04 04 00
00:02:06: 0x00D0: 00 00 2D 09 06 03 04 0A 0A 00 02
00:02:06: Registration Response Transmitted
00:02:06: Registration acknowledgement from 0003.e350.9b8d, SID 3 on Cable3/0/U0
00:02:06: REG-ACK confirmation code : 0

```

The following is a sample output displaying the TLVs on a Cisco uBR10012 router:

Router#**debug cable tlvs**

```

CMTS TLV encodings debugging is on
*Jul 7 19:39:28.366: Found Modem Capabilities TLV
*Jul 7 19:39:28.366: Found Upstream Service Flow TLV
*Jul 7 19:39:28.366: Found Downstream Service Flow TLV
*Jul 7 19:39:28.366: Found Privacy Enable TLV
*Jul 7 19:39:28.366: Subscriber Mgmt Filter Group Length: 20
*Jul 7 19:39:28.366: Found Subscriber Mgmt Filter Group Type
*Jul 7 19:39:28.366: Subscriber Mgmt Filter Group Length >= 20
*Jul 7 19:39:28.366: Found Subscriber Mgmt. Control TLV: 35
*Jul 7 19:39:28.366: Found Subscriber Mgmt IP table TLV
*Jul 7 19:39:28.366: Found Vendor Specific Information TLV
Jul 7 19:39:28.394: Found CMTS-MIC TLV
Jul 7 19:39:28.394: Found Network Access TLV
Jul 7 19:39:28.394: Found Max CPEs TLV
Jul 7 19:39:28.394: Found Upstream Service Flow TLV
Jul 7 19:39:28.394: Found Downstream Service Flow TLV
Jul 7 19:39:28.394: Found Privacy Enable TLV

```

**debug cable tlvs**

```
Jul 7 19:39:28.394: Found CM-MIC TLV
Jul 7 19:39:28.394: Found Modem Capabilities TLV
Jul 7 19:39:28.394: Found CM IP Address TLV
```

|                         |                                |                                                                                |
|-------------------------|--------------------------------|--------------------------------------------------------------------------------|
| <b>Related Commands</b> | <b>debug cable dynsrv</b>      | Displays debugging information about DOCSIS 1.1 dynamic service flow messages. |
|                         | <b>debug cable interface</b>   | Enables debugging on a specific cable interface.                               |
|                         | <b>debug cable mac-address</b> | Enables debugging for MAC-layer information for a specific CM.                 |



# debug cable tod

To display debugging for the local time-of-day (ToD) server on the Cisco CMTS, use the **debug cable tod** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable tod**

**no debug cable tod**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| Command History | Release     | Modification                                                     |
|-----------------|-------------|------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced.                                     |
|                 | 12.2(11)BC2 | Support for this command was added to the Release 12.2 BC train. |

|                         |                                                                                                                                                                                                                                                                                                    |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | This command displays information about the operation of the ToD server that is onboard the Cisco CMTS. Before this command will display any output, you must also use the <b>debug cable interface</b> command to enable debugging operations on each interface that has CMs you wish to monitor. |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                    |
|-----------------|------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows typical output for the <b>debug cable tod</b> command: |
|-----------------|------------------------------------------------------------------------------------|

```
Router# debug cable interface c3/0
Router# debug cable tod
TOD server debugging is on
Router#
```

```
000104: Jun 8 05:48:08.783: tod: Received request from 10.1.1.27 (0001.9659.4411) on
Cable3/0
000105: Jun 8 05:48:15.015: tod: Received request from 10.1.1.32 (0030.96f9.65d9) on
Cable3/0
000106: Jun 8 05:48:16.363: tod: Received request from 10.3.3.10 (0001.9659.43fd) on
Cable3/0
000107: Jun 8 05:48:17.335: tod: Received request from 10.2.2.43 (0002.fdfa.0a35) on
Cable3/0
```

For telco-return CMs, the ToD server verifies that the IP address for the CM making the ToD request is on the correct cable interface, so as to prevent IP spoofing. If the IP address and interface do not match, the following message is printed:

```
000104: Jun 8 05:48:08.783: tod: Cant match output i/f for telco return
```

|                  |                                |                                                                |
|------------------|--------------------------------|----------------------------------------------------------------|
| Related Commands | <b>debug cable interface</b>   | Enables debugging on a specific cable interface.               |
|                  | <b>debug cable mac-address</b> | Enables debugging for MAC-layer information for a specific CM. |

# debug cable transmit

To display debug messages for messages that the CMTS transmits on the cable interface, use the **debug cable transmit** command in privileged EXEC mode. To stop displaying debug messages, use the **no** form of this command.

- debug cable transmit**
- no debug cable transmit**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release              | Modification                 |
|-----------------|----------------------|------------------------------|
|                 | 12.0(7)XR            | This command was introduced. |
|                 | 12.1(1)T, 12.1(2)EC1 | This command was disabled.   |
|                 | 12.1(11b)EC          | This command was removed.    |

**Examples** The following command enables debugging of messages that the CMTS transmits on the cable interface:

```
Router# debug cable transmit
CMTS debug transmit debugging is on
Router#
```

The **debug cable transmit** command was disabled in Cisco IOS Release 12.1 T, 12.1 EC, and later releases, although it still appears in the CLI until Cisco IOS Release 12.1(11b)EC. To monitor the packets transmitted by the CMs, use the **debug ip packet** command instead.

Because the **debug ip packet** command produces a large volume of messages, you must use it together with an access list to restrict the messages to a particular CM or CPE device to avoid affecting system performance. For example, the following commands would set up an access list that monitors all traffic being sent between the hosts with the two specified IP addresses:

```
router# configure terminal
router(config)# access-list 150 permit ip host ip-address-1 host ip-address-2
router(config)# access-list 150 permit ip host ip-address-2 host ip-address-1
router(config)# exit
router# debug ip packet 150 detail
```

| Related Commands | Command                    | Description                                                             |
|------------------|----------------------------|-------------------------------------------------------------------------|
|                  | <b>debug cable receive</b> | Enables debugging for received packets.                                 |
|                  | <b>debug ip packet</b>     | Enables debugging of IP packets received and transmitted by the router. |

# debug cable ubg

To enable debugging information for upstream bonding groups, use the **debug cable ubg** command in privileged EXEC mode. To turn off debugging, use the **no** form of this command.

**debug cable ubg**

**no debug cable ubg**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                  |
|-----------------|-------------|---------------------------------------------------------------|
|                 | 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

**Examples** The following is a sample output of the **debug cable ubg** command:

```
Router#debug cable ubg
```

```
CMTS UBG assignment info debugging is on
```

```
Apr 27 02:28:57.140: CM 001a.c3ff.d59e UBG input TCS: 0x000000FF; mtc_cap: 4
Apr 27 02:28:57.140: CM 001a.c3ff.d59e UBG trace: Configure UBG list
Apr 27 02:28:57.140: UBG 1(4): bitmap 0x0000000F, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 2(4): bitmap 0x000000F0, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 3(1): bitmap 0x00000004, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 4(2): bitmap 0x00000003, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 5(1): bitmap 0x00000001, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 6(1): bitmap 0x00000002, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 7(2): bitmap 0x00000030, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 8(1): bitmap 0x00000010, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 9(1): bitmap 0x00000020, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 65536(1): bitmap 0x00000001, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65537(1): bitmap 0x00000002, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65538(1): bitmap 0x00000004, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65539(1): bitmap 0x00000008, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65540(1): bitmap 0x00000010, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65541(1): bitmap 0x00000020, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65542(1): bitmap 0x00000040, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65543(1): bitmap 0x00000080, attrib 0x20000000
Apr 27 02:28:57.140: CM 001a.c3ff.d59e UBG trace: ubg after MC & mtc cap match
Apr 27 02:28:57.140: UBG 1(4): bitmap 0x0000000F, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 2(4): bitmap 0x000000F0, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 3(1): bitmap 0x00000004, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 4(2): bitmap 0x00000003, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 5(1): bitmap 0x00000001, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 6(1): bitmap 0x00000002, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 7(2): bitmap 0x00000030, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 8(1): bitmap 0x00000010, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 9(1): bitmap 0x00000020, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 65536(1): bitmap 0x00000001, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65537(1): bitmap 0x00000002, attrib 0x20000000
```

```

Apr 27 02:28:57.140: UBG 65538(1): bitmap 0x00000004, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65539(1): bitmap 0x00000008, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65540(1): bitmap 0x00000010, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65541(1): bitmap 0x00000020, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65542(1): bitmap 0x00000040, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65543(1): bitmap 0x00000080, attrib 0x20000000
Apr 27 02:28:57.140: CM 001a.c3ff.d59e
SF_REQ: 0x00000000, SF_FOR: 0x00000000,
CM_REQ: 0x00000000, CM_FOR: 0x00000000
Apr 27 02:28:57.140: CM 001a.c3ff.d59e UBG trace: ubg after SF attrib match
Apr 27 02:28:57.140: UBG trace: input queue
Apr 27 02:28:57.140: UBG 1(4): bitmap 0x0000000F, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 2(4): bitmap 0x000000F0, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 3(1): bitmap 0x00000004, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 4(2): bitmap 0x00000003, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 5(1): bitmap 0x00000001, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 6(1): bitmap 0x00000002, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 7(2): bitmap 0x00000030, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 8(1): bitmap 0x00000010, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 9(1): bitmap 0x00000020, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 65536(1): bitmap 0x00000001, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65537(1): bitmap 0x00000002, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65538(1): bitmap 0x00000004, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65539(1): bitmap 0x00000008, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65540(1): bitmap 0x00000010, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65541(1): bitmap 0x00000020, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65542(1): bitmap 0x00000040, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65543(1): bitmap 0x00000080, attrib 0x20000000
Apr 27 02:28:57.140: CM 001a.c3ff.d59e UBG trace: ubg after CM attrib match
Apr 27 02:28:57.140: UBG trace: input queue
Apr 27 02:28:57.140: UBG 1(4): bitmap 0x0000000F, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 2(4): bitmap 0x000000F0, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 3(1): bitmap 0x00000004, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 4(2): bitmap 0x00000003, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 5(1): bitmap 0x00000001, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 6(1): bitmap 0x00000002, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 7(2): bitmap 0x00000030, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 8(1): bitmap 0x00000010, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 9(1): bitmap 0x00000020, attrib 0xA0000000
Apr 27 02:28:57.140: UBG 65536(1): bitmap 0x00000001, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65537(1): bitmap 0x00000002, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65538(1): bitmap 0x00000004, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65539(1): bitmap 0x00000008, attrib 0x20000000
Apr 27 02:28:57.140: UBG 65540(1): bitmap 0x00000010, attrib 0x20000000
Apr 27 02:28:57.160: UBG 65543 bg_bitrate 2560001 avail_bitrate 2560000
Apr 27 02:28:57.160: UBG 65543 Scale Factor 9 Rank 23040000
Apr 27 02:28:57.160: CM 001a.c3ff.d59e Output UBG 7: 0x00000030
Apr 27 02:28:57.160: UBG mgmt: UBG 7 SF Queue
Apr 27 02:28:57.160: CM 001a.c3ff.d59e SF 22

```

# debug cable ucc

To debug upstream channel change (UCC) messages generated when CMs request or are assigned a new channel, use the **debug cable ucc** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable ucc**

**no debug cable ucc**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release | Modification                 |
|-----------------|---------|------------------------------|
|                 | 11.3NA  | This command was introduced. |

**Usage Guidelines** This command activates debugging of any upstream channel change (UCC) messages generated when CMs request or are assigned a new channel. When this command is activated, any messages related to upstream channel changes are displayed on the Cisco CMTS console.

**Examples** The following is typical output from the **debug cable ucc** command:

```
Router# debug cable ucc
Router#
SID 2 has been registered
Mac Address of CM for UCC
 00:0E:1D:D8:52:16
UCC Message Sent to CM
Changing SID 2 from upstream channel 1 to upstream channel 2
```

| Related Commands | Command         | Description                         |
|------------------|-----------------|-------------------------------------|
|                  | debug cable ucd | Enables debugging for UCD messages. |

# debug cable ucd

To debug upstream channel descriptor (UCD) messages, use the **debug cable ucd** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

- debug cable ucd**
- no debug cable ucd**

| Syntax Description | This command has no arguments or keywords.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |              |        |                              |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|--------|------------------------------|
| Command Modes      | Privileged EXEC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |              |        |                              |
| Command History    | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>11.3NA</td><td>This command was introduced.</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Release | Modification | 11.3NA | This command was introduced. |
| Release            | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |              |        |                              |
| 11.3NA             | This command was introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |              |        |                              |
| Usage Guidelines   | This command activates debugging of any upstream channel descriptor (UCD) messages. UCD messages contain information about upstream channel characteristics and are sent to the CMs on the HFC network. Cable modems that are configured to use enhanced upstream channels use these UCD messages to identify and select an enhanced upstream channel to use. When this command is activated, any messages related to upstream channel descriptors are displayed on the Cisco CMTS console.                                                                                                                                                                                                                                                                                                                                                                                                                              |         |              |        |                              |
| Examples           | <p>The following is typical output from the <b>debug cable ucd</b> command:</p> <pre>UCD MESSAGE ----- FRAME HEADER   FC                      - 0xC2 ==   MAC_PARM                - 0x00   LEN                     - 0xD3 MAC MANAGEMENT MESSAGE HEADER   DA                      - 01E0.2F00.0001   SA                      - 0009.0CEF.3730   msg LEN                 - C1   DSAP                    - 0   SSAP      t             - 0   control                  - 03   version                  - 01   type                     - 02 == US Channel ID              - 1 Configuration Change Count - 5 Mini-Slot Size             - 4 DS Channel ID              - 1 Symbol Rate                - 8 Frequency                  - 10000000 Preamble Pattern           - CC CC CC CC CC CC CC CC CC CC CC CC CC CC 0D 0D Burst Descriptor 0   Interval Usage Code      - 1   Modulation Type          - 1 == QPSK</pre> |         |              |        |                              |

```

Differential Encoding - 2 == OFF
Preamble Length - 64
Preamble Value Offset - 56
FEC Error Correction - 0
FEC Codeword Length - 16
Scrambler Seed - 0x0152
Maximum Burst Size - 2
Guard Time Size - 8
Last Codeword Length - 1 == FIXED
Scrambler on/off - 1 == ON
Burst Descriptor 1
 Interval Usage Code - 3
 Modulation Type - 1 == QPSK
 Differential Encoding - 2 == OFF
 Preamble Length - 128
 Preamble Value Offset - 0
 FEC Error Correction - 5
 FEC Codeword Length - 34
 Scrambler Seed - 0x0152
 Maximum Burst Size - 0
 Guard Time Size - 48
 Last Codeword Length - 1 == FIXED
 Scrambler on/off - 1 == ON
Burst Descriptor 2
 Interval Usage Code - 4
 Modulation Type - 1 == QPSK
 Differential Encoding - 2 == OFF
 Preamble Length - 128
 Preamble Value Offset - 0
 FEC Error Correction - 5
 FEC Codeword Length - 34
 Scrambler Seed - 0x0152
 Maximum Burst Size - 0
 Guard Time Size - 48
 Last Codeword Length - 1 == FIXED
 Scrambler on/off - 1 == ON
Burst Descriptor 3
 Interval Usage Code - 5
 Modulation Type - 1 == QPSK
 Differential Encoding - 2 == OFF
 Preamble Length - 72
 Preamble Value Offset - 48
 FEC Error Correction - 5
 FEC Codeword Length - 75
 Scrambler Seed - 0x0152
 Maximum Burst Size - 0
 Guard Time Size - 8
 Last Codeword Length - 1 == FIXED
 Scrambler on/off - 1 == ON

```

The UCD MESSAGE is :

```

0xC2 0x00 0x00 0xD3 0x00 0x00 0x01 0xE0
0x2F 0x00 0x00 0x01 0x00 0x09 0x0C 0xEF
0x37 0x30 0x00 0xC1 0x00 0x00 0x03 0x01
0x02 0x00 0x01 0x05 0x04 0x01 0x01 0x01
0x08 0x02 0x04 0x00 0x98 0x96 0x80 0x03
0x10 0xCC 0xCC 0xCC 0xCC 0xCC 0xCC 0xCC
0xCC 0xCC 0xCC 0xCC 0xCC 0xCC 0xCC 0x0D
0x0D 0x04 0x25 0x01 0x01 0x01 0x01 0x02
0x01 0x02 0x03 0x02 0x00 0x40 0x04 0x02
0x00 0x38 0x05 0x01 0x00 0x06 0x01 0x10
0x07 0x02 0x01 0x52 0x08 0x01 0x02 0x09
0x01 0x08 0x0A 0x01 0x01 0x0B 0x01 0x01
0x04 0x25 0x03 0x01 0x01 0x01 0x02 0x01

```

debug cable ucd

0x02 0x03 0x02 0x00 0x80 0x04 0x02 0x00  
0x00 0x05 0x01 0x05 0x06 0x01 0x22 0x07  
0x02 0x01 0x52 0x08 0x01 0x00 0x09 0x01  
0x30 0x0A 0x01 0x01 0x0B 0x01 0x01 0x04  
0x25 0x04 0x01 0x01 0x01 0x02 0x01 0x02  
0x03 0x02 0x00 0x80 0x04 0x02 0x00 0x00  
0x05 0x01 0x05 0x06 0x01 0x22 0x07 0x02  
0x01 0x52 0x08 0x01 0x00 0x09 0x01 0x30  
0x0A 0x01 0x01 0x0B 0x01 0x01 0x04 0x25  
0x05 0x01 0x01 0x01 0x02 0x01 0x02 0x03  
0x02 0x00 0x48 0x04 0x02 0x00 0x30 0x05  
0x01 0x05 0x06 0x01 0x4B 0x07 0x02 0x01  
0x52 0x08 0x01 0x00 0x09 0x01 0x08 0x0A  
0x01 0x01 0x0B 0x01 0x01

Related Commands

| Command         | Description                         |
|-----------------|-------------------------------------|
| debug cable ucc | Enables debugging for UCC messages. |



# debug cable upconverter

To enable hardware debugging of an internal upconverter, use the **debug cable upconverter** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable upconverter**

**no debug cable upconverter**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release    | Modification                                                                                          |
|-----------------|------------|-------------------------------------------------------------------------------------------------------|
|                 | 12.1(5)EC  | This command was introduced for the Cisco uBR7100 series routers.                                     |
|                 | 12.2(11)CY | Support was added for the Cisco uBR10-MC5X20S cable interface line card on the Cisco uBR10012 router. |

**Usage Guidelines** This command activates hardware debugging of the internal upconverter that is onboard the Cisco uBR7100 series or the Cisco uBR10-MC5X20S cable interface line card on the Cisco uBR10012 router.

**Examples** The following command shows how to enable the **debug cable upconverter** output:

```
Router# debug cable upconverter
Upconverter programming debugging is on
Router# config t
Router(config)# int c1/0
Router(config-if)# no cable downstream rf-shutdown
Ack failed from upconverter
Card does not have upconverter?
Error in upconverter!
Router(config-if)#
```

| Related Commands | Command                             | Description                                                                                                                                                         |
|------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable downstream rf-power</b>    | Configures the desired RF output power on the integrated upconverter.                                                                                               |
|                  | <b>cable downstream rf-shutdown</b> | Enables or disables the RF output from the integrated upconverter.                                                                                                  |
|                  | <b>show controllers cable</b>       | Displays status and configuration information for the cable interface. On Cisco uBR7100 series routers, this includes information about the integrated upconverter. |

# debug cable us-adm-ctrl

To enable debugging of upstream admission control activity, use the **debug cable us-adm-ctrl** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable us-adm-ctrl**

**no debug cable us-adm-ctrl**

**Syntax Description**      This command has no arguments or keywords.

**Command Modes**          Privileged EXEC

| Command History | Release    | Modification                                                                                                                                    |
|-----------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(4)CX  | This command was introduced for the Cisco uBR10012 router.                                                                                      |
|                 | 12.2(4)BC1 | Support for this command was added to the Release 12.2 BC train for the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 routers. |
|                 | 12.2(11)CY | Support was added for the Cisco uBR10-MC5X20S cable interface line card on the Cisco uBR10012 router.                                           |

**Examples**                  The following command shows how to enable debugging output for upstream admission control:

```
Router# debug cable us-adm-ctrl
CMTS upstream admission control debugging is on

Router# show debug
CMTS:
 CMTS upstream admission control debugging is on
Router#
```

The following are the debug messages that are displayed when the CMTS does not have an admission policy, scheduling instance, or service class for a registering CM:

```
Null service class
Null admission policy
Null scheduler instance
```

The CMTS displays the following debug message when a CM requests a scheduling type that is either not defined, not recognized, or not supported:

```
Undefined scheduling Type
```

| Related Commands | Command                                 | Description                                                                          |
|------------------|-----------------------------------------|--------------------------------------------------------------------------------------|
|                  | <b>cable upstream admission-control</b> | Determines the percentage of overbooking allowed on the upstream channel.            |
|                  | <b>debug cable mac-scheduler</b>        | Displays information for the MAC layer's scheduler and admission control activities. |

# debug cable wbcmts

To enable debugging information for the wideband CMTS, use the **debug cable wbcmts** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

```
debug cable wbcmts [association | bpi | cli | guardian | statistics | wbka | wcd]

no debug cable wbcmts [association | bpi | cli | guardian | statistics | wbka | wcd]
```

Syntax Description

|             |                                                                                                                                      |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| association | (Optional) Enables debug messages for RF to fiber-node associations.                                                                 |
| bpi         | (Optional) Enables debug messages for Baseline Privacy Interface (BPI).                                                              |
| cli         | (Optional) Enables debug messages for wideband-related Cisco IOS CLI activity.                                                       |
| guardian    | (Optional) Enables debug messages for DOCSIS 3.0 Downstream Channel Bonding operations performed by the modular-host line card.      |
| ha          | (Optional) Enables debug messages for wideband high availability (HA).                                                               |
| statistics  | (Optional) Enables debug messages for wideband-related statistics.                                                                   |
| wbka        | (Optional) Enables debug messages for wideband keepalive (WBKA) operations.                                                          |
| wcd         | (Optional) Enables debug messages with wideband channel information as conveyed in the Bonded Downstream Channel Descriptor (BD CD). |

Command Default

No wideband-related debug messages are enabled.

Command Modes

Privileged EXEC (#)

Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.      |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. |

Usage Guidelines

The **debug cable wbcmts** command is intended for use by Cisco technical support personnel.



Caution

Because debugging output is assigned high priority in the CPU process, it can render the system unusable. For this reason, use **debug** commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support personnel. Moreover, it is best to use **debug** commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased **debug** command processing overhead will affect system use.

If you specify **debug cable wbcmts** with no argument, generic wideband debugging messages are enabled.

Before issuing the **debug cable wbcmts wcd** command to display BDCD information, you must issue the **debug cable interface** command to enable debugging on the cable interface line card configured for DOCSIS 3.0 protocol operations. For example:

```
Router# debug cable interface Cable slot/subslot/port
Router# debug cable wbcmts wcd
```

In the preceding example, *slot/subslot/port* specifies a port on a cable interface line card that has been configured for DOCSIS 3.0 protocol operations with the **modular-host subslot** command. The line card cable interface for which you enable debug messages with **debug cable interface** is the first cable interface that is up. For example, if the line card configured for DOCSIS 3.0 protocol operations is located in slot 7/0, specify interface 7/0/1 if 7/0/0 is down and 7/0/1 is up.

For information on configuring a cable interface line card for DOCSIS 3.0 protocol operations, see the **modular-host subslot** command.

## Examples

The following example shows how to enable debug messages for RF to fiber-node associations, and shows sample output:

```
Router# debug cable wbcmts association

WBCMTS Association debugging is on
...
Router(config-fiber-node)# downstream modular-cable 3/0/0 rf-channel 0-1
Router(config-fiber-node)# end
...
Router#
*Nov 7 17:16:08.835: Remove Wideband-Cable3/0/0:0 nb_info 8/1 index 0,chanID 203 bundle 1,
Index 203
*Nov 7 17:16:08.835: Remove Cable8/1/0 wb_info 8/1 wb_index 0, chanID 72, Index 72
*Nov 7 17:16:08.835: %SYS-5-CONFIG_I: Configured from console by console

Router#
```

The following example shows how to enable debug messages for wideband CMTS statistics, and shows sample output.

```
Router# debug cable wbcmts statistics

WBCMTS statistics debugging is on

Router#
Router# show interface cable 8/1/0 service-flow 19 counters
Sfid Packets Bytes PacketDrop Bits/Sec Packet/Sec
19 0 0 0 0 0
Router#
*Nov 7 17:28:09.815: LC SFID=19, SFID=19, Blaze_Index=23 Reading stats for SFID 1 @ index
23 on 3/0/0
```

## Related Commands

| Command                    | Description                                          |
|----------------------------|------------------------------------------------------|
| <b>debug c10k-jacket</b>   | Enables debugging information for the Wideband SIP.  |
| <b>debug cable fn</b>      | Enables debugging information for cable fiber nodes. |
| <b>debug hw-module bay</b> | Enables debugging information for a Wideband SPA.    |

# debug cable wbcmts admission-control

To enable debugging of the wideband interface admission control on the Cisco CMTS, use the **debug cable wbcmts admission-control** command. To disable debugging, use the **no** form of this command.

```
debug cable wbcmts admission-control

no debug cable wbcmts admission-control
```

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCC | This command was introduced. |

**Usage Guidelines** This command enables debugging of the wideband interface.

**Examples** The following example shows a sample output of the **debug cable wbcmts admission-control** command.

```
Router> enable
Router# debug cable wbcmts admission-control
Oct 5 15:43:32.230: Wideband-Cable1/0/0:0 NB 6/1/0 app 1, nb cir = 0, total bkt cir = 0
Oct 5 15:43:32.230: total_cfg_non_ex_pct: 0, prev_bkt_resv: 0
Oct 5 15:43:32.230: total_cfg_ex_pct: 100, total_cfg_non_ex_pct: 0, total_ex_cir_cfg_bps: 72000000, total bkt resv 0
Oct 5 15:43:32.230: Wideband-Cable1/0/0:0 app 1, per_bucket_cfg_excl_bps: 0, max_non_ex_bps: 0, total_nonex_resvd_bps: 0, bkt type: 0
```

| Related Commands | Command                                     | Description                                                                                                            |
|------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
|                  | <b>cable admission-control</b>              | Configures the CPU and memory thresholds for the Cisco CMTS router and supporting broadband processing engines (BPEs). |
|                  | <b>cable admission-control event</b>        | Configures and enables admission control event types on the Cisco CMTS router.                                         |
|                  | <b>cable admission-control ds-bandwidth</b> | Configures admission control downstream bandwidth thresholds on the Cisco CMTS router.                                 |
|                  | <b>cable admission-control us-bandwidth</b> | Configures admission control upstream bandwidth thresholds on the Cisco CMTS router.                                   |

| Command                              | Description                                                                                                           |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>debug cable admission-control</b> | Enables automatic admission control troubleshooting processes on the Cisco CMTS router.                               |
| <b>show cable admission-control</b>  | Displays the current admission control configuration and status on the Cisco CMTS router or on a specified interface. |

# debug cable wbcmts resiliency

To enable debugging of the resiliency operation, use the **debug cable wbcmts resiliency** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cable wbcmts resiliency**

**no debug cable wbcmts resiliency**

**Syntax Description** This command has no arguments or keywords.

**Command Default** No wideband-related debug messages are enabled.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCB | This command was introduced. |

**Usage Guidelines** The **debug cable wbcmts** command is intended for use by Cisco technical support personnel.



**Caution**

Because debugging output is assigned high priority in the CPU process, it can render the system unusable. For this reason, use **debug** commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support personnel. Moreover, it is best to use **debug** commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased **debug** command processing overhead will affect system use.

| Related Commands | Command                    | Description                                          |
|------------------|----------------------------|------------------------------------------------------|
|                  | <b>debug c10k-jacket</b>   | Enables debugging information for the Wideband SIP.  |
|                  | <b>debug cable fn</b>      | Enables debugging information for cable fiber nodes. |
|                  | <b>debug hw-module bay</b> | Enables debugging information for a Wideband SPA.    |
|                  | <b>debug cable wbcmts</b>  | Enables debugging information for the wideband CMTS. |



# debug cable-modem bpkm

To display information about Baseline Privacy Interface (BPI) key management, use the **debug cable-modem bpkm** command in privileged EXEC mode. To disable BPI debugging, use the **no** form of this command.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**debug cable-modem bpkm {errors | events | packets}**

**no debug cable-modem bpkm {errors | events | packets}**

## Syntax Description:

|                |                                                  |
|----------------|--------------------------------------------------|
| <b>errors</b>  | Debugs CM privacy errors.                        |
| <b>events</b>  | Debugs events related to cable baseline privacy. |
| <b>packets</b> | Debugs baseline privacy packets.                 |

## Command Modes

Privileged EXEC

## Command History

| Release           | Modification                                                          |
|-------------------|-----------------------------------------------------------------------|
| 11.3(4)NA         | This command was introduced for the Cisco uBR904 cable access router. |
| 12.0(4)XI1        | Support was added for the Cisco uBR924 cable access router.           |
| 12.0(5), 12.0(5)T | This command was removed from normal access.                          |

## Usage Guidelines

Baseline privacy key management exchanges take place only when both the router and the CMTS are running code images that support baseline privacy, and the privacy class of service is enabled via the configuration file that is downloaded to the cable access router. Baseline privacy code images for the router contain k1, k8, or k9 in the code image name.

In Cisco IOS Release 12.0(5) and later releases, this command is available only under the direction of TAC or field service, and should be used only while debugging CM operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

## Examples

The following example shows typical debug output when the CMTS does not have privacy enabled:

Router# **debug cable-modem bpkm errors**

```
cm_bpkm_fsm(): machine: KEK, event/state: EVENT_4_TIMEOUT/STATE_B_AUTH_WAIT, new state: STATE_B_AUTH_WAIT
```

```
cm_bpkm_fsm(): machine: KEK, event/state: EVENT_4_TIMEOUT/STATE_B_AUTH_WAIT, new state: STATE_B_AUTH_WAIT
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to down
cm_bpkm_fsm(): machine: KEK, event/state: EVENT_1_PROVISIONED/STATE_A_START, new state: STATE_B_AUTH_WAIT
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to up
Router#
```

**Related Commands**

| Command                             | Description                                                                  |
|-------------------------------------|------------------------------------------------------------------------------|
| <b>debug cable-modem bridge</b>     | Displays bridge filter processing information.                               |
| <b>debug cable-modem error</b>      | Displays debugging messages for the cable interface driver.                  |
| <b>debug cable-modem interrupts</b> | Displays information about CM interrupts.                                    |
| <b>debug cable-modem mac log</b>    | Displays comprehensive debugging messages for the cable interface MAC layer. |
| <b>debug cable-modem map</b>        | Displays the timing of MAP and sync messages.                                |

# debug cable-modem bridge

To display bridge filter processing information, use the **debug cable-modem bridge** command in Privileged EXEC mode. To disable bridge filter debugging, use the **no** form of this command.

**Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**debug cable-modem bridge**

**no debug cable-modem bridge**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release           | Modification                                                          |
|-----------------|-------------------|-----------------------------------------------------------------------|
|                 | 11.3(4)NA         | This command was introduced for the Cisco uBR904 cable access router. |
|                 | 12.0(4)XI1        | Support was added for the Cisco uBR924 cable access router.           |
|                 | 12.0(5), 12.0(5)T | This command was removed from normal access.                          |

**Usage Guidelines** When the interface is down, all bridge table entries learned on the Ethernet interface are set to discard because traffic is not bridged until the cable interface has completed initialization. After the interface (the line protocol) is completely up, bridge table entries learned on the Ethernet interface program the cable's MAC data filters. The cable MAC hardware filters out any received packets whose addresses are not in the filters. In this way, the cable interface only receives packets addressed to its own MAC address or an address it has learned on the Ethernet interface.

In Cisco IOS Release 12.0(5) and later releases, this command is available only under the direction of TAC or field service, and should be used only while debugging CM operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

**Examples** The following shows typical output for the **debug cable-modem bridge** command:

```
Router# debug cable-modem bridge
Router#
%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to downshut
cm_tbridge_add_entry(): MAC not initialized, discarding entry: 00e0.fe7a.186fno shut
cm_tbridge_add_entry(): MAC not initialized, discarding entry: 00e0.fe7a.186f
%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to up
cm_tbridge_add_entry(): Adding entry 00e0.fe7a.186f to filter 2
```

| Related Commands | Command                             | Description                                                                  |
|------------------|-------------------------------------|------------------------------------------------------------------------------|
|                  | <b>debug cable-modem bpk</b>        | Displays Baseline Privacy Interface (BPI) information.                       |
|                  | <b>debug cable-modem error</b>      | Displays debugging messages for the cable interface driver.                  |
|                  | <b>debug cable-modem interrupts</b> | Displays information about CM interrupts.                                    |
|                  | <b>debug cable-modem mac log</b>    | Displays comprehensive debugging messages for the cable interface MAC layer. |
|                  | <b>debug cable-modem map</b>        | Displays the timing of MAP and sync messages.                                |

# debug cable-modem error

To display debugging messages for the cable interface driver, use the **debug cable-modem error** command in privileged EXEC mode. To turn off cable interface debugging, use the **no** form of this command.

Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

**debug cable-modem error**

**no debug cable-modem error**

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | This command has no arguments or keywords. |
|---------------------------|--------------------------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | Privileged EXEC |
|----------------------|-----------------|

| Command History | Release           | Modification                                                          |
|-----------------|-------------------|-----------------------------------------------------------------------|
|                 | 11.3(4)NA         | This command was introduced for the Cisco uBR904 cable access router. |
|                 | 12.0(4)XI1        | Support was added for the Cisco uBR924 cable access router.           |
|                 | 12.0(5), 12.0(5)T | This command was removed from normal access.                          |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | <p>This command displays detailed output about the sanity checking of received frame formats, the acquisition of downstream QAM/FEC lock, the receipt or non-receipt of SYNC messages from the CMTS, reception errors, and bandwidth request failures.</p> <p>In Cisco IOS Release 12.0(5) and later releases, this command is available only under the direction of TAC or field service, and should be used only while debugging CM operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.</p> |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                    |
|-----------------|------------------------------------------------------------------------------------|
| <b>Examples</b> | The following shows typical output for the <b>debug cable-modem error</b> command: |
|-----------------|------------------------------------------------------------------------------------|

```
Router# debug cable-modem error
Router#
*Mar 7 20:16:29: AcquireSync(): Update rate is 100 Hz
*Mar 7 20:16:30: 1st Sync acquired after 1100 ms.
*Mar 7 20:16:30: Recovery loop is locked (7/9)
*Mar 7 20:16:30: 2nd Sync acquired after 100 ms.
*Mar 7 20:16:30: Recovery loop is locked (10/15)
```

| Related Commands | Command                         | Description                                                                 |
|------------------|---------------------------------|-----------------------------------------------------------------------------|
|                  | <b>debug cable-modem bpkm</b>   | Displays information about Baseline Privacy Interface (BPI) key management. |
|                  | <b>debug cable-modem bridge</b> | Displays bridge filter processing information.                              |

| Command                             | Description                                                                  |
|-------------------------------------|------------------------------------------------------------------------------|
| <b>debug cable-modem interrupts</b> | Displays information about CM interrupts.                                    |
| <b>debug cable-modem mac log</b>    | Displays comprehensive debugging messages for the cable interface MAC layer. |
| <b>debug cable-modem map</b>        | Displays the timing of MAP and sync messages.                                |

# debug cable-modem interrupts

To display information about cable interface interrupts, use the **debug cable-modem interrupts** command in privileged EXEC mode. To turn off cable interface interrupt debugging, use the **no** form of this command.

Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

**debug cable-modem interrupts**

**no debug cable-modem interrupts**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release           | Modification                                                          |
|-----------------|-------------------|-----------------------------------------------------------------------|
|                 | 11.3(4)NA         | This command was introduced for the Cisco uBR904 cable access router. |
|                 | 12.0(4)XI1        | Support was added for the Cisco uBR924 cable access router.           |
|                 | 12.0(5), 12.0(5)T | This command was removed from normal access.                          |

**Usage Guidelines** In Cisco IOS Release 12.0(5) and later releases, this command is available only under the direction of TAC or field service, and should be used only while debugging CM operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

**Examples** The following shows typical output for the **debug cable-modem interrupts** command:

```
Router# debug cable-modem interrupts
Router#
*** bcm3220_rx_mac_msg_interrupt ***
*** bcm3220_rx_mac_msg_interrupt ***
bcm3220_tx_interrupt
*** bcm3220_rx_mac_msg_interrupt ***
bcm3220_tx_interrupt
*** bcm3220_rx_mac_msg_interrupt ***
bcm3220_tx_interrupt
bcm3220_tx_interrupt
bcm3220_tx_interrupt
bcm3220_tx_interrupt
```

| Related Commands | Command                          | Description                                                                  |
|------------------|----------------------------------|------------------------------------------------------------------------------|
|                  | <b>debug cable-modem bpkm</b>    | Displays information about Baseline Privacy Interface (BPI) key management.  |
|                  | <b>debug cable-modem bridge</b>  | Displays bridge filter processing information.                               |
|                  | <b>debug cable-modem error</b>   | Displays debugging messages for the cable interface driver.                  |
|                  | <b>debug cable-modem mac log</b> | Displays comprehensive debugging messages for the cable interface MAC layer. |
|                  | <b>debug cable-modem map</b>     | Displays the timing of MAP and sync messages.                                |



# debug cable-modem mac log

To display comprehensive debugging messages for the cable interface MAC layer, use the **debug cable-modem mac log** command in privileged EXEC mode. To turn off debugging for the MAC layer, use the **no** form of this command.

Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

**debug cable-modem mac log** [*verbose*]

**no debug cable-modem mac log** [*verbose*]

## Syntax Description

|                |                                                                 |
|----------------|-----------------------------------------------------------------|
| <b>verbose</b> | (Optional) Displays periodic MAC layer events, such as ranging. |
|----------------|-----------------------------------------------------------------|

## Command Modes

Privileged EXEC

## Command History

| Release    | Modification                                                          |
|------------|-----------------------------------------------------------------------|
| 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router. |
| 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.           |
| 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.           |
| 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
| 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.           |

## Usage Guidelines

The **debug cable-modem mac log** command is one of the most useful debugging tools because MAC-layer log messages are written to a circular log file even when debugging is not turned on. These messages include timestamps, events, and information pertinent to these events. Enter the **debug cable-modem mac log** command to view MAC log messages. If you want to view this information without entering debug mode, use the **show controllers cable-modem number mac log** command. The same information is displayed by both commands.



### Tip

The **debug cable-modem mac log** command displays details about the MAC-layer processes. In particular, this command displays the details of the CM's registration and initialization process.

If the router interface fails to come up or resets periodically, the MAC log will show what happened. For example, if an address is not obtained from the DHCP server, an error is logged, initialization starts over, and the CM scans for a downstream frequency. The **debug cable-modem mac log** command displays the log from oldest entry to newest entry.

After initial ranging is successful (dhcp\_state has been reached), further RNG-REQ/RNG-RSP messages and watchdog timer entries are suppressed from output unless the **verbose** keyword is used. Note that CMAC\_LOG\_WATCHDOG\_TIMER entries while in the maintenance\_state are normal when using the **verbose** keyword.

**Note**

This command should be used only while debugging CM operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

**Examples**

This example shows typical output from the **debug cable-modem mac log** command. The fields of the output are the time since bootup, the log message, and in some cases a parameter that gives more detail about the log entry.

```
uBR924# debug cable-modem mac log
Cable Modem mac log debugging is on
```

```
*Mar 7 01:42:59: 528302.040 CMAC_LOG_LINK_DOWN
*Mar 7 01:42:59: 528302.042 CMAC_LOG_RESET_FROM_DRIVER
*Mar 7 01:42:59: 528302.044 CMAC_LOG_STATE_CHANGE wait_for_link_up_state
*Mar 7 01:42:59: 528302.046 CMAC_LOG_DRIVER_INIT_IDB_SHUTDOWN 0x08098D02
*Mar 7 01:42:59: 528302.048 CMAC_LOG_LINK_DOWN
*Mar 7 01:43:05: 528308.428 CMAC_LOG_DRIVER_INIT_IDB_RESET 0x08098E5E
*Mar 7 01:43:05: 528308.432 CMAC_LOG_LINK_DOWN
*Mar 7 01:43:05: 528308.434 CMAC_LOG_LINK_UP
*Mar 7 01:43:05: 528308.436 CMAC_LOG_STATE_CHANGE ds_channel_scanning_state
*Mar 7 01:43:05: 528308.440 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 88/453000000/855000000/6000000
*Mar 7 01:43:05: 528308.444 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 89/930000000/105000000/6000000
*Mar 7 01:43:05: 528308.448 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 90/111250000/117250000/6000000
*Mar 7 01:43:05: 528308.452 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 91/231012500/327012500/6000000
*Mar 7 01:43:05: 528308.456 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 92/333015000/333015000/6000000
*Mar 7 01:43:05: 528308.460 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 93/339012500/399012500/6000000
*Mar 7 01:43:05: 528308.462 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 94/405000000/447000000/6000000
*Mar 7 01:43:05: 528308.466 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 95/123015000/129015000/6000000
*Mar 7 01:43:05: 528308.470 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 96/135012500/135012500/6000000
*Mar 7 01:43:05: 528308.474 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 97/141000000/171000000/6000000
*Mar 7 01:43:05: 528308.478 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 98/219000000/225000000/6000000
*Mar 7 01:43:05: 528308.482 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 99/177000000/213000000/6000000
*Mar 7 01:43:05: 528308.486 CMAC_LOG_WILL_SEARCH_SAVED_DS_FREQUENCY 663000000
*Mar 7 01:43:05: 528308.488 CMAC_LOG_WILL_SEARCH_USER_DS_FREQUENCY 663000000
*Mar 7 01:43:07: 528310.292 CMAC_LOG_DS_64QAM_LOCK_ACQUIRED 663000000
.
.
.
528383.992 CMAC_LOG_STATE_CHANGE registration_state
528384.044 CMAC_LOG_REG_REQ_MSG_QUEUED
528384.050 CMAC_LOG_REG_REQ_TRANSMITTED
528384.052 CMAC_LOG_REG_RSP_MSG_RCVD
528384.078 CMAC_LOG_COS_ASSIGNED_SID 1/4
528384.102 CMAC_LOG_RNG_REQ_QUEUED 4
528384.102 CMAC_LOG_REGISTRATION_OK
528384.102 CMAC_LOG_STATE_CHANGE establish_privacy_state
528384.102 CMAC_LOG_STATE_CHANGE maintenance_state
528388.444 CMAC_LOG_RNG_REQ_TRANSMITTED
528388.444 CMAC_LOG_RNG_RSP_MSG_RCVD
528398.514 CMAC_LOG_RNG_REQ_TRANSMITTED
528398.516 CMAC_LOG_RNG_RSP_MSG_RCVD
528408.584 CMAC_LOG_RNG_REQ_TRANSMITTED
528408.586 CMAC_LOG_RNG_RSP_MSG_RCVD
528414.102 CMAC_LOG_WATCHDOG_TIMER
528418.654 CMAC_LOG_RNG_REQ_TRANSMITTED
528418.656 CMAC_LOG_RNG_RSP_MSG_RCVD
528428.726 CMAC_LOG_RNG_REQ_TRANSMITTED
528428.728 CMAC_LOG_RNG_RSP_MSG_RCVD
528438.796 CMAC_LOG_RNG_REQ_TRANSMITTED
```

```

528438.798 CMAC_LOG_RNG_RSP_MSG_RCVD
528444.102 CMAC_LOG_WATCHDOG_TIMER
528444.492 CMAC_LOG_LINK_DOWN
528444.494 CMAC_LOG_RESET_FROM_DRIVER
528444.494 CMAC_LOG_STATE_CHANGE wait_for_link_up_state
528444.494 CMAC_LOG_DRIVER_INIT_IDB_SHUTDOWN 0x08098D02
528444.494 CMAC_LOG_LINK_DOWN
528474.494 CMAC_LOG_WATCHDOG_TIMER
528504.494 CMAC_LOG_WATCHDOG_TIMER
528534.494 CMAC_LOG_WATCHDOG_TIMER

```

0 events dropped due to lack of a chunk



#### Note

The line “0 events dropped due to lack of a chunk” at the end of the display indicates that no log entries were discarded due to a temporary lack of memory. This means the log is accurate and reliable.

The following example shows typical output of the **debug cable-modem mac log verbose** command. The **verbose** keyword displays periodic events such as ranging.

```

Router# debug cable mac log verbose
Cable Modem mac log debugging is on (verbose)
Router#
574623.810 CMAC_LOG_RNG_REQ_TRANSMITTED
574623.812 CMAC_LOG_RNG_RSP_MSG_RCVD
574627.942 CMAC_LOG_WATCHDOG_TIMER
574633.880 CMAC_LOG_RNG_REQ_TRANSMITTED
574633.884 CMAC_LOG_RNG_RSP_MSG_RCVD
574643.950 CMAC_LOG_RNG_REQ_TRANSMITTED
574643.954 CMAC_LOG_RNG_RSP_MSG_RCVD
574654.022 CMAC_LOG_RNG_REQ_TRANSMITTED
574654.024 CMAC_LOG_RNG_RSP_MSG_RCVD
574657.978 CMAC_LOG_WATCHDOG_TIMER
574664.094 CMAC_LOG_RNG_REQ_TRANSMITTED
574664.096 CMAC_LOG_RNG_RSP_MSG_RCVD
574674.164 CMAC_LOG_RNG_REQ_TRANSMITTED
574674.166 CMAC_LOG_RNG_RSP_MSG_RCVD

```

The following example shows how to disable verbose debugging:

```

Router# no debug cable mac log verbose
Cable Modem mac log debugging is off
Router#

```

#### Related Commands

| Command                                      | Description                                                                 |
|----------------------------------------------|-----------------------------------------------------------------------------|
| <b>debug cable-modem bpkm</b>                | Displays information about Baseline Privacy Interface (BPI) key management. |
| <b>debug cable-modem bridge</b>              | Displays bridge filter processing information.                              |
| <b>debug cable-modem error</b>               | Displays debugging messages for the cable interface driver.                 |
| <b>debug cable-modem interrupts</b>          | Displays information about CM interrupts.                                   |
| <b>debug cable-modem mac messages</b>        | Displays the MAC-layer messages.                                            |
| <b>debug cable-modem mac messages dynsrv</b> | Displays the dynamic service MAC-layer messages.                            |
| <b>debug cable-modem map</b>                 | Displays the timing of MAP and sync messages.                               |

# debug cable-modem mac messages

To display debugging messages for specific MAC-layer messages, use the **debug cable-modem mac messages** command in privileged EXEC mode. To turn off debugging for the MAC layer, use the **no** form of this command.

Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

**debug cable-modem mac messages** *message-type*

**no debug cable-modem mac messages** *message-type*

| Syntax Description | <i>message-type</i> | Selects the specific type of MAC-layer message type to display:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    |                     | <ul style="list-style-type: none"> <li>• <b>dcc-ack</b>—Displays the Dynamic Channel Change Acknowledge (DCC-ACK) messages received by the CM.</li> <li>• <b>dcc-req</b>—Displays the Dynamic Channel Change Request (DCC-REQ) messages received by the CM.</li> <li>• <b>dcc-rsp</b>—Displays the Dynamic Channel Change Response (DCC-RSP) messages transmitted by the CM.</li> <li>• <b>dynsrv</b>—Displays the Dynamic Service messages transmitted and received by the CM (for more information, see the <b>debug cable-modem mac messages dynsrv</b> command).</li> <li>• <b>map</b>—Displays the MAP messages received by the CM.</li> <li>• <b>reg-ack</b>—Displays the Registration Acknowledge (REG-ACK) messages transmitted by the CM.</li> <li>• <b>reg-req</b>—Displays the Registration Request (REG-REQ) messages transmitted by the CM.</li> <li>• <b>reg-rsp</b>—Displays the Registration Response (REG-RSP) messages received by the CM.</li> <li>• <b>rng-req</b>—Displays the Ranging Request (RNG-REQ) messages transmitted by the CM.</li> <li>• <b>rng-rsp</b>—Displays the Ranging Response (RNG-RSP) messages received by the CM.</li> <li>• <b>sync</b>—Displays the Time Synchronization (SYNC) messages received by the CM.</li> <li>• <b>ucc-req</b>—Displays the Upstream Channel Change Request (UCC-REQ) messages received by the CM.</li> <li>• <b>ucc-rsp</b>—Displays the Upstream Channel Change Response (UCC-RSP) messages transmitted by the CM.</li> <li>• <b>ucd</b>—Displays the Upstream Channel Descriptor (UCD) messages received by the CM.</li> <li>• <b>up-dis</b>—Displays the Upstream Transmitter Disable (UP-DIS) messages received by the CM.</li> </ul> |

**Command Modes** Privileged EXEC

| Command History | Release    | Modification                                                                                                  |
|-----------------|------------|---------------------------------------------------------------------------------------------------------------|
|                 | 11.3(4)NA  | This command was introduced for the Cisco uBR904 cable access router.                                         |
|                 | 12.0(4)XI1 | Support was added for the Cisco uBR924 cable access router.                                                   |
|                 | 12.1(3)XL  | Support was added for the Cisco uBR905 cable access router.                                                   |
|                 | 12.1(5)XU1 | Support was added for the Cisco CVA122 Cable Voice Adapter.                                                   |
|                 | 12.2(2)XA  | Support was added for the Cisco uBR925 cable access router.                                                   |
|                 | 12.2(15)CZ | The <b>dcc-ack</b> , <b>dcc-req</b> , and <b>dcc-rsp</b> options were added to support DOCSIS 1.1 operations. |
|                 | 12.3(2)T   | The <b>up-dis</b> option was supported.                                                                       |

**Usage Guidelines** The output from this command is very verbose, displaying the details of the DOCSIS MAC-layer messages, and is usually not needed for normal interface debugging. The command is most useful when attempting to attach a router to a CMTS that is not DOCSIS-qualified.



**Caution**

This command should be used only while debugging CM operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

**Examples** The following example shows typical output from the **debug cable-modem mac messages** command. A separate command must be given for each message type to be displayed.

Much of the information, such as REG-REQ messages, is displayed in hexadecimal dump format, using the Type/Length/Value (TLV) format required by the DOCSIS specification.



**Note**

For complete descriptions of the MAC-layer management messages, see the DOCSIS Radio Frequency Interface Specification (SP-RF1v1.1-I07-010829 or later), available from CableLabs at <http://www.cablemodem.com/>

```
Router# debug cable mac messages ucd
ucd message debugging is on
Router# debug cable mac messages map
map message debugging is on
Router# debug cable mac messages rng-rsp
rng-rsp message debugging is on
Router#
*Mar 7 01:44:06:
*Mar 7 01:44:06: UCD MESSAGE
*Mar 7 01:44:06: -----
*Mar 7 01:44:06: FRAME HEADER
*Mar 7 01:44:06: FC - 0xC2 == MAC Management
*Mar 7 01:44:06: MAC_PARM - 0x00
*Mar 7 01:44:06: LEN - 0xD3
*Mar 7 01:44:06: MAC MANAGEMENT MESSAGE HEADER
*Mar 7 01:44:06: DA - 01E0.2F00.0001
*Mar 7 01:44:06: SA - 00E0.1EA5.BB60
```

## debug cable-modem mac messages

```

*Mar 7 01:44:06: msg LEN - C1
*Mar 7 01:44:06: DSAP - 0
*Mar 7 01:44:06: SSAP - 0
*Mar 7 01:44:06: control - 03
*Mar 7 01:44:06: version - 01
*Mar 7 01:44:06: type - 02 == UCD
*Mar 7 01:44:06: RSVD - 0
*Mar 7 01:44:06: US Channel ID - 1
*Mar 7 01:44:06: Configuration Change Count - 4
*Mar 7 01:44:06: Mini-Slot Size - 8
*Mar 7 01:44:06: DS Channel ID - 1
*Mar 7 01:44:06: Symbol Rate - 8
*Mar 7 01:44:06: Frequency - 20000000
*Mar 7 01:44:06: Preamble Pattern - CC CC CC CC CC CC CC CC CC CC CC CC CC 0D 0D
*Mar 7 01:44:06: Burst Descriptor 0
*Mar 7 01:44:06: Interval Usage Code - 1
*Mar 7 01:44:06: Modulation Type - 1 == QPSK
*Mar 7 01:44:06: Differential Encoding - 2 == OFF
*Mar 7 01:44:06: Preamble Length - 64
*Mar 7 01:44:06: Preamble Value Offset - 56
*Mar 7 01:44:06: FEC Error Correction - 0
*Mar 7 01:44:06: FEC Codeword Info Bytes - 16
*Mar 7 01:44:06: Scrambler Seed - 0x0152
*Mar 7 01:44:06: Maximum Burst Size - 1
*Mar 7 01:44:06: Guard Time Size - 8
*Mar 7 01:44:06: Last Codeword Length - 1 == FIXED
*Mar 7 01:44:06: Scrambler on/off - 1 == ON
*Mar 7 01:44:06: Burst Descriptor 1
*Mar 7 01:44:06: Interval Usage Code - 3
*Mar 7 01:44:06: Modulation Type - 1 == QPSK
*Mar 7 01:44:06: Differential Encoding - 2 == OFF
*Mar 7 01:44:06: Preamble Length - 128
*Mar 7 01:44:06: Preamble Value Offset - 0
*Mar 7 01:44:06: FEC Error Correction - 5
*Mar 7 01:44:06: FEC Codeword Info Bytes - 34
*Mar 7 01:44:06: Scrambler Seed - 0x0152
*Mar 7 01:44:06: Maximum Burst Size - 0
*Mar 7 01:44:06: Guard Time Size - 48
*Mar 7 01:44:06: Last Codeword Length - 1 == FIXED
*Mar 7 01:44:06: Scrambler on/off - 1 == ON
*Mar 7 01:44:06: Burst Descriptor 2
*Mar 7 01:44:06: Interval Usage Code - 4
*Mar 7 01:44:06: Modulation Type - 1 == QPSK
*Mar 7 01:44:06: Differential Encoding - 2 == OFF
*Mar 7 01:44:06: Preamble Length - 128
*Mar 7 01:44:06: Preamble Value Offset - 0
*Mar 7 01:44:06: FEC Error Correction - 5
*Mar 7 01:44:06: FEC Codeword Info Bytes - 34
*Mar 7 01:44:06: Scrambler Seed - 0x0152
*Mar 7 01:44:06: Maximum Burst Size - 0
*Mar 7 01:44:06: Guard Time Size - 48
*Mar 7 01:44:06: Last Codeword Length - 1 == FIXED
*Mar 7 01:44:06: Scrambler on/off - 1 == ON
*Mar 7 01:44:06: Burst Descriptor 3
*Mar 7 01:44:06: Interval Usage Code - 5
*Mar 7 01:44:06: Modulation Type - 1 == QPSK
*Mar 7 01:44:06: Differential Encoding - 2 == OFF
*Mar 7 01:44:06: Preamble Length - 72
*Mar 7 01:44:06: Preamble Value Offset - 48
*Mar 7 01:44:06: FEC Error Correction - 5
*Mar 7 01:44:06: FEC Codeword Info Bytes - 75
*Mar 7 01:44:06: Scrambler Seed - 0x0152
*Mar 7 01:44:06: Maximum Burst Size - 0
*Mar 7 01:44:06: Guard Time Size - 8

```

```

*Mar 7 01:44:06: Last Codeword Length - 1 == FIXED
*Mar 7 01:44:06: Scrambler on/off - 1 == ON
*Mar 7 01:44:06:
*Mar 7 01:44:06:
*Mar 7 01:44:06: MAP MESSAGE
*Mar 7 01:44:06: -----
*Mar 7 01:44:06: FRAME HEADER
*Mar 7 01:44:06: FC - 0xC3 == MAC Mement with Extended Header
*Mar 7 01:44:06: MAC_PARM - 0x02
*Mar 7 01:44:06: LEN - 0x42
*Mar 7 01:44:06: EHDR - 0x00 0x00
*Mar 7 01:44:06: MAC MANAGEMENT MESSAGE HEADER
*Mar 7 01:44:06: DA - 01E0.2F00.0001
.
*Mar 7 01:44:17: RNG-RSP MESSAGE
*Mar 7 01:44:17: -----
*Mar 7 01:44:17: FRAME HEADER
*Mar 7 01:44:17: FC - 0xC2 == MAC Management
*Mar 7 01:44:17: MAC_PARM - 0x00
*Mar 7 01:44:17: LEN - 0x2B
*Mar 7 01:44:17: MAC MANAGEMENT MESSAGE HEADER
*Mar 7 01:44:17: DA - 00F0.1EB2.BB61
.
*Mar 7 01:44:20: REG-REQ MESSAGE
*Mar 7 01:44:20: -----
*Mar 7 01:44:20: C20000A5 000000E0 1EA5BB60 00F01EB2
*Mar 7 01:44:20: BB610093 00000301 06000004 03010104
*Mar 7 01:44:20: 1F010101 0204003D 09000304 001E8480
*Mar 7 01:44:20: 04010705 04000186 A0060200 0C070101
*Mar 7 01:44:20: 080300F0 1E112A01 04000000 0A020400
*Mar 7 01:44:20: 00000A03 04000002 58040400 00000105
*Mar 7 01:44:20: 04000000 01060400 00025807 04000000
*Mar 7 01:44:20: 3C2B0563 6973636F 06105E4F C908C655
*Mar 7 01:44:20: 61086FD5 5C9D756F 7B730710 434D5453
*Mar 7 01:44:20: 204D4943 202D2D2D 2D2D2D2D 0C040000
*Mar 7 01:44:20: 00000503 010100
*Mar 7 01:44:20:
*Mar 7 01:44:20:
*Mar 7 01:44:20: REG-RSP MESSAGE
*Mar 7 01:44:20: -----
*Mar 7 01:44:20: FRAME HEADER
*Mar 7 01:44:20: FC - 0xC2 == MAC Management
*Mar 7 01:44:20: MAC_PARM - 0x00
*Mar 7 01:44:20: LEN - 0x29
*Mar 7 01:44:20: MAC MANAGEMENT MESSAGE HEADER
*Mar 7 01:44:20: DA - 00F0.1EB2.BB61

```

**Related Commands**

| Command                             | Description                                                                 |
|-------------------------------------|-----------------------------------------------------------------------------|
| <b>debug cable-modem bpkm</b>       | Displays information about Baseline Privacy Interface (BPI) key management. |
| <b>debug cable-modem bridge</b>     | Displays bridge filter processing information.                              |
| <b>debug cable-modem error</b>      | Displays debugging messages for the cable interface driver.                 |
| <b>debug cable-modem interrupts</b> | Displays information about CM interrupts.                                   |
| <b>debug cable-modem map</b>        | Displays the timing of MAP and sync messages.                               |

**debug cable-modem mac messages**

| Command                                      | Description                                                            |
|----------------------------------------------|------------------------------------------------------------------------|
| <b>debug cable-modem mac messages dynsrv</b> | Displays the dynamic service messages.                                 |
| <b>debug cable-modem up-dis</b>              | Displays debugging for Upstream Transmitter Disable (UP-DIS) messages. |



# debug cable-modem mac messages dynsrv

To display debug messages for the dynamic service MAC-layer messages that are generated when voice calls are made using the dynamic SID feature, use the **debug cable-modem mac messages dynsrv** command in privileged EXEC mode. To turn off debugging for the dynamic service MAC-layer messages, use the **no** form of this command.

**Cisco uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter**

**debug cable-modem mac messages dynsrv**

**no debug cable-modem mac messages dynsrv**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release                | Modification                                                          |
|-----------------|------------------------|-----------------------------------------------------------------------|
|                 | 12.0(7)XR and 12.1(1)T | This command was introduced for the Cisco uBR924 cable access router. |
|                 | 12.1(3)XL              | Support was added for the Cisco uBR905 cable access router.           |
|                 | 12.1(5)XU1             | Support was added for the Cisco CVA122 Cable Voice Adapter.           |
|                 | 12.2(2)XA              | Support was added for the Cisco uBR925 cable access router.           |

**Usage Guidelines** This command begins the display of debug messages that show the dynamic service MAC messages that are generated when a voice call is made using the dynamic SID feature. Dynamic SIDs use the following DOCSIS MAC-layer messages to create a new SID when a voice call is made and to delete it when the call is over:

- DSA-REQ—Dynamic Service Addition Request, sent to establish a new service flow.
- DSA-RSP—Dynamic Service Addition Response, sent in reply to DSA-REQ to confirm or deny the new service flow.
- DSA-ACK—Dynamic Service Addition Acknowledge, sent in reply to DSA-RSP to acknowledge the creation of the service flow.
- DSD-REQ—Dynamic Service Deletion Request, sent to delete an existing service flow when it is no longer needed (for example, when a voice call has terminated).
- DSD-RSP—Dynamic Service Deletion Response, sent in response to DSD-REQ to delete an existing service flow.



**Note**

Dynamic Services are described in the DOCSIS 1.1 specification (SP-RF1v1.1-I03-991105 or later revision), available from CableLabs at <http://www.cablemodem.com/>

**Examples**

The following example shows how to enable the display of debug messages related to dynamic service operations:

```
Router# debug cable-modem mac messages dynsrv
Router#
```

The following example shows how to turn off the display of debug messages related to dynamic service operations:

```
Router# no debug cable-modem mac messages dynsrv
Router#
```

The following example shows the types of debug messages that are displayed when a voice call is made. This example shows that dynamic SID 52 is created for this particular call.

```
DSA-REQ TLV's:

US Flow Scheduler(24):
 Unsolicited Grant Size - 19:2:89
 Nominal Grant Interval - 20:4:20000
Created New Dynamic Service State, Transaction_id = 3
```

```
DSA-REQ MESSAGE TLVS

C2000026 00010010 07DF6854 00507366
23270014 00000301 0F000003 180A1302
00591404 00004E20
```

```
597.721 CMAC_LOG_DSA_REQ_MESSAGE_EVENT
```

```
DSA-REQ MESSAGE
```

```

FRAME HEADER
 FC - 0xC2 == MAC Management
 MAC_PARM - 0x00
 LEN - 0x26
MAC MANAGEMENT MESSAGE HEADER
 DA - 0010.abcd.ef00
 SA - 0050.abcd.ef00
 msg LEN - 14
 DSAP - 0
 SSAP - 0
 control - 03
 version - 01
 type - 0F == DSA-REQ
 RSVD - 0
 Transaction ID - 3
```

```
597.725 CMAC_LOG_DSA_RSP_MSG_RCVD
```

```
DSA-RSP MESSAGE
```

```

FRAME HEADER
 FC - 0xC2 == MAC Management
 MAC_PARM - 0x00
 LEN - 0x26
MAC MANAGEMENT MESSAGE HEADER
 DA - 0050.abcd.ef00
 SA - 0010.abcd.ef00
 msg LEN - 14
 DSAP - 0
 SSAP - 0
 control - 03
 version - 01
```

```

type - 10 == DSA-RSP
RSVD - 0
Transaction ID - 3
Response - 0 == DSA-RSP-OK
SID - 52

Adding sid = 52 to sid_index = 1
597.729 CMAC_LOG_QOS_ADD_FLOW_SID 52

```

## Related Commands

| Command                                 | Description                                                                                                                          |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>debug cable-modem mac log</b>        | Displays debug messages for other types of MAC-layer messages, including MAP messages, upstream request messages, and sync messages. |
| <b>show controllers cable-modem qos</b> | Displays detailed information about the QoS configuration for the router.                                                            |

# debug cable-modem map

To display the timing of MAP messages to sync messages, and the timing between MAP messages, use the **debug cable-modem map** command in privileged EXEC mode. To turn off debugging of MAP messages, use the **no** form of this command.

Cisco uBR904, uBR905, uBR924, uBR925 cable access routers, Cisco CVA122 Cable Voice Adapter

- debug cable-modem map
- no debug cable-modem map

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release           | Modification                                                          |
|-----------------|-------------------|-----------------------------------------------------------------------|
|                 | 11.3(4)NA         | This command was introduced for the Cisco uBR904 cable access router. |
|                 | 12.0(4)XI1        | Support was added for the Cisco uBR924 cable access router.           |
|                 | 12.0(5), 12.0(5)T | This command was removed from normal access.                          |

**Usage Guidelines** In Cisco IOS Release 12.0(5) and later releases, this command is available only under the direction of TAC or field service, and should be used only while debugging CM operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

**Examples** The following shows typical output from the **debug cable map** command:

```
Router# debug cable-modem map
Cable Modem MAP debugging is on
Router#
*Mar 7 20:12:08: 595322.942: Min MAP to sync=72
*Mar 7 20:12:08: 595322.944: Max map to map time is 40
*Mar 7 20:12:08: 595322.982: Min MAP to sync=63
*Mar 7 20:12:08: 595323.110: Max map to map time is 41
*Mar 7 20:12:08: 595323.262: Min MAP to sync=59
*Mar 7 20:12:08: 595323.440: Max map to map time is 46
*Mar 7 20:12:09: 595323.872: Min MAP to sync=58
```

| Related Commands | Command                  | Description                                                                 |
|------------------|--------------------------|-----------------------------------------------------------------------------|
|                  | debug cable-modem bpkm   | Displays information about Baseline Privacy Interface (BPI) key management. |
|                  | debug cable-modem bridge | Displays bridge filter processing information.                              |
|                  | debug cable-modem error  | Displays debugging messages for the cable interface driver.                 |

| Command                             | Description                                                                  |
|-------------------------------------|------------------------------------------------------------------------------|
| <b>debug cable-modem interrupts</b> | Displays information about cable interface interrupts.                       |
| <b>debug cable-modem mac log</b>    | Displays comprehensive debugging messages for the cable interface MAC layer. |

# debug cable-modem up-dis

To display information about DOCSIS 1.1 Upstream Transmitter Disable (UP-DIS) messages received by the cable modem, use the **debug cable-modem up-dis** command in Privileged EXEC mode. To disable debugging output for UP-DIS messages, use the **no** form of this command.

**debug cable-modem up-dis**

**no debug cable-modem up-dis**

|                    |                                            |                              |
|--------------------|--------------------------------------------|------------------------------|
| Syntax Description | This command has no arguments or keywords. |                              |
| Command Default    | No default behavior or values.             |                              |
| Command Modes      | Privileged EXEC                            |                              |
| Command History    | Release                                    | Modification                 |
|                    | 12.3(2)T                                   | This command was introduced. |

**Usage Guidelines**

This command shows debugging messages about the Upstream Transmitter Disable (UP-DIS) messages that the CMTS sends to a CM. The CMTS can send an UP-DIS message to a cable modem to suspend its operation on the cable network. The UP-DIS message can instruct the cable modem to suspend its operations for a limited period of time or permanently.

After sending the UP-DIS message, the CMTS allows the cable modem back on the network only if the cable modem is power-cycled, or if the CMTS sends another UP-DIS message re-enabling the cable modem’s upstream transmitter. If a cable modem is already in the suspended state, it must ignore any further UP-DIS messages except a UP-DIS message re-enabling its operations.

  
**Note**

See the DOCSIS 1.1 specification (revision SP-RFIV1.1-I09-020830 and above) for information on the content and format of the UP-DIS messages.

**Examples**

The following examples show typical output for the **debug cable up-dis** command, which displays the MAC frame header and UP-DIS Timeout Interval value (in milliseconds):

```
Router# debug cable up-dis
up-dis message debugging is on

Router#

UP-DIS MESSAGE");
-----");
*Mar 7 01:44:06: FRAME HEADER
*Mar 7 01:44:06: FC - 0xC2 == MAC Management
*Mar 7 01:44:06: MAC_PARM - 0x00
```

```
*Mar 7 01:44:06: LEN - 0xD3
*Mar 7 01:44:06: MAC MANAGEMENT MESSAGE HEADER
*Mar 7 01:44:06: DA - 01E0.2F00.0001
*Mar 7 01:44:06: SA - 00E0.1EA5.BB60
*Mar 7 01:44:06: msg LEN - 10
*Mar 7 01:44:06: DSAP - 0
*Mar 7 01:44:06: SSAP - 0
*Mar 7 01:44:06: control - 03
*Mar 7 01:44:06: version - 01
*Mar 7 01:44:06: type - 28 == UP-DIS
*Mar 7 01:44:06: RSVD - 0

*Mar 7 01:44:06: Timer Value - 20000
```

#### Related Commands

|                                       |                                                              |
|---------------------------------------|--------------------------------------------------------------|
| <b>debug cable-modem mac messages</b> | Displays debugging messages for specific MAC-layer messages. |
|---------------------------------------|--------------------------------------------------------------|

# debug checkpoint

To enable debugging of the Checkpointing Facility (CF) subsystem on the Cisco uBR10012 router, use the **debug checkpoint** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

```
debug checkpoint [all | errors | messages | temporary | timers]

no debug checkpoint [all | errors | messages | temporary | timers]
```

Syntax Description

|           |                                                                                           |
|-----------|-------------------------------------------------------------------------------------------|
| all       | (Optional) Enables all checkpoint debugging types.                                        |
| errors    | (Optional) Enables debugging of any checkpoint errors that occur.                         |
| messages  | (Optional) Enables debugging for the messages that are sent during checkpoint operations. |
| temporary | (Optional) Enables basic checkpoint debugging (default).                                  |
| timers    | (Optional) Enables debugging of the checkpoint timers.                                    |

Command Modes

Privileged EXEC

Command History

| Release     | Modification                                                                   |
|-------------|--------------------------------------------------------------------------------|
| 12.2(11)BC3 | This command was introduced for the Cisco uBR10012 universal broadband router. |

Usage Guidelines

The **debug checkpoint** command enables debugging of the Checkpoint Facility (CF) subsystem, which passes messages from the Active processor to the Standby processor. It also handles sequencing and throttling, as needed, during redundancy operations.

Examples

The following example shows how to enable debugging messages for the CF subsystem:

```
Router# debug checkpoint

Router#
```

Related Commands

| Command                 | Description                                                                       |
|-------------------------|-----------------------------------------------------------------------------------|
| debug cable interface   | Enables debugging on a specific cable interface.                                  |
| debug cable mac-address | Enables debugging for a specific CM, as identified by its hardware (MAC) address. |



# debug cmts ipc-cable base

To debug the base layer cable inter-processor communication (IPC) software, use the **debug cmts ipc-cable base** command from the Privileged EXEC mode. To disable the debug flag, use the **no** form of the command.

```
debug cmts ipc-cable base {client {all | id cid} |
 entity client-id cid entity-id eid |
 service |
 session client-id cid entity-id eid slot slot subslot subslot}

no debug cmts ipc-cable base {client {all | id cid} |
 entity client-id cid entity-id eid |
 service |
 session client-id cid entity-id eid slot slot subslot subslot}
```

| Syntax Description            |  |                                                                                            |
|-------------------------------|--|--------------------------------------------------------------------------------------------|
| <b>client</b>                 |  | Displays all the clients or the specified client-related IPC information                   |
| <b>entity</b>                 |  | Displays the IPC information of the entity.                                                |
| <b>service</b>                |  | Displays the IPC information related to service.                                           |
| <b>session</b>                |  | Displays the IPC information related to this session.                                      |
| <b>all</b>                    |  | Displays the IPC information for all clients.                                              |
| <b>client-id</b> <i>cid</i>   |  | Specifies the client ID of the cable IPC layer. The valid client ID range is from 0 to 8.  |
| <b>entity-id</b> <i>eid</i>   |  | Specifies the entity ID of the cable IPC layer. The valid entity ID range is from 0 and 2. |
| <b>slot</b> <i>slot</i>       |  | Specifies the cable interface slot. The valid range is from 5 to 8.                        |
| <b>subslot</b> <i>subslot</i> |  | Specifies the cable interface subslot. The valid values are 0 and 1.                       |

**Command Default** Debug is disabled.

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

**Usage Guidelines**

Each debug log has a debug-enable flag that is set by the **debug cmts ipc-cable** command. Each cable IPC debug log has a severity level. The **logging cmts ipc-cable** command allows you to selectively enable cable IPC debug logs based on the log severities. A debug log is recorded only if its severity is equal to or higher than the configured log-level, and if its debug enable flag is set.

**Examples**

The following example shows the IPC base layers service debugging message:

```
Router(config)# logging cmts ipc-cable log-level debugging
Router# debug cmt ipc-cable base service
Router# hw-module subslot 8/0 reset
```

```
Proceed with reset? [confirm]
*Feb 11 05:24:44.101: CLNT DOCSIS C8/0 is down for apps
*Feb 11 05:24:44.101: CLNT HCCP C8/0 is down for apps
*Feb 11 05:24:44.101: CLNT PKTCBL C8/0 is down for apps
*Feb 11 05:24:44.101: CLNT PLFM C8/0 is down for apps
*Feb 11 05:24:44.101: CLNT SNMP C8/0 is down for apps
*Feb 11 05:24:44.101: CLNT GUARDIAN C8/0 is down for apps
*Feb 11 05:24:44.101: CLNT TEST C8/0 is down for apps
*Feb 11 05:24:44.101: Default IPC service 8/0 deleted
*Feb 11 05:24:44.101: Remote IPC service 8/0 svc_type 2 closed
*Feb 11 05:24:44.101: Remote IPC service 8/0 svc_type 3 closed
*Feb 11 05:24:44.101: Remote IPC service 8/0 svc_type 1 closed
```

The following example shows the IPC base layer all clients debugging message:

**Note**

When client debugging is enabled, all entity and session debugging messages are also enabled.

```
Router(config)# logging cmts ipc-cable log-level debugging
Router# debug cmts ipc-cable base client all
```

```
*Feb 11 06:00:19.345: CLNT DOCSIS C8/1 is down for apps
*Feb 11 06:00:19.345: CLNT HCCP C8/1 is down for apps
*Feb 11 06:00:19.345: CLNT PKTCBL C8/1 is down for apps
*Feb 11 06:00:19.345: CLNT PLFM C8/1 is down for apps
*Feb 11 06:00:19.345: CLNT SNMP C8/1 is down for apps
*Feb 11 06:00:19.345: CLNT GUARDIAN C8/1 is down for apps
*Feb 11 06:00:19.345: CLNT TEST C8/1 is down for apps
*Feb 11 06:00:19.345: cr10k_ipc_flush_req_xmt_queue -> Flush the packets in xmt queue 8/1
*Feb 11 06:00:19.345: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 8/1, RP-CLC

*Feb 11 06:00:19.349: cr10k_ipc_remove_session -> Start calling get session instance for
slot 8/1
*Feb 11 06:00:19.349: Session 8/1 for client 0 has removed
*Feb 11 06:00:19.349: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 8/1, RP-CLC

*Feb 11 06:00:19.349: cr10k_ipc_remove_session -> Start calling get session instance for
slot 8/1
*Feb 11 06:00:19.349: Session 8/1 for client 1 has removed
*Feb 11 06:00:19.349: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 8/1, RP-CLC

*Feb 11 06:00:19.349: cr10k_ipc_remove_session -> Start calling get session instance for
slot 8/1
*Feb 11 06:00:19.349: Session 8/1 for client 2 has removed
```

```

*Feb 11 06:00:19.349: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 8/1, RP-CLC

*Feb 11 06:00:19.349: cr10k_ipc_remove_session -> Start calling get session instance for
slot 8/1
*Feb 11 06:00:19.349: Session 8/1 for client 3 has removed
*Feb 11 06:00:19.349: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 8/1, RP-CLC

*Feb 11 06:00:19.349: cr10k_ipc_remove_session -> Start calling get session instance for
slot 8/1
*Feb 11 06:00:19.349: Session 8/1 for client 4 has removed
*Feb 11 06:00:19.349: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 8/1, RP-CLC

*Feb 11 06:00:19.349: cr10k_ipc_remove_session -> Start calling get session instance for
slot 8/1
*Feb 11 06:00:19.349: Session 8/1 for client 5 has removed
*Feb 11 06:00:19.349: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 8/1, RP-CLC

*Feb 11 06:00:19.349: cr10k_ipc_remove_session -> Start calling get session instance for
slot 8/1
*Feb 11 06:00:19.349: Session 8/1 for client 6 has removed
*Feb 11 06:00:19.349: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 8/1, RP-CLC

*Feb 11 06:00:19.349: cr10k_ipc_remove_session -> Start calling get session instance for
slot 8/1
*Feb 11 06:00:19.349: Session 8/1 for client 7 has removed
*Feb 11 06:00:19.349: cr10k_ipc_flush_req_xmt_queue -> Flush the packets in xmt queue 8/1
*Feb 11 06:00:19.349: cr10k_ipc_flush_req_xmt_queue -> Flush the packets in xmt queue 8/1
*Feb 11 06:00:19.349: cr10k_ipc_flush_req_xmt_queue -> Flush the packets in xmt queue 8/1
*Feb 11 06:00:19.349: %IPCOIR-3-TIMEOUT: Timeout waiting for a response from slot 8/1.
*Feb 11 06:00:19.349: %IPCOIR-2-CARD_UP_DOWN: Card in slot 8/1 is down. Notifying
5cable-mc520h-d driver.

```

The following example shows the IPC base layer DOCSIS client and route processor-line card (RP-CLC) entity debugging message:



#### Note

When entity debugging is enabled, session debugging messages are also enabled.

```

Router# debug cmts ipc-cable base entity client-id 0 entity-id 0

*Feb 11 06:05:48.961: CLNT DOCSIS C5/1 is down for apps
*Feb 11 06:05:48.961: CLNT HCCP C5/1 is down for apps
*Feb 11 06:05:48.961: CLNT PKTCBL C5/1 is down for apps
*Feb 11 06:05:48.961: CLNT PLFM C5/1 is down for apps
*Feb 11 06:05:48.961: CLNT SNMP C5/1 is down for apps
*Feb 11 06:05:48.961: CLNT GUARDIAN C5/1 is down for apps
*Feb 11 06:05:48.961: CLNT TEST C5/1 is down for apps
*Feb 11 06:05:48.961: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 5/1, RP-CLC
*Feb 11 06:05:48.961: cr10k_ipc_remove_session -> Start calling get session instance for
slot 5/1
*Feb 11 06:05:48.961: Session 5/1 for client 0 has removed
*Feb 11 06:05:48.965: %IPCOIR-3-TIMEOUT: Timeout waiting for a response from slot 5/1.
*Feb 11 06:05:48.965: %IPCOIR-2-CARD_UP_DOWN: Card in slot 5/1 is down. Notifying
5cable-mc520h-d driver.

```

The following example shows the IPC base layer session debugging message:

```
Router# debug cmts ipc-cable base session client 0 entity 0 slot 8 subslot 1

*Feb 11 06:11:25.809: CLNT DOCSIS C8/1 is down for apps
*Feb 11 06:11:25.809: CLNT HCCP C8/1 is down for apps
*Feb 11 06:11:25.809: CLNT PKTCBL C8/1 is down for apps
*Feb 11 06:11:25.809: CLNT PLFM C8/1 is down for apps
*Feb 11 06:11:25.809: CLNT SNMP C8/1 is down for apps
*Feb 11 06:11:25.809: CLNT GUARDIAN C8/1 is down for apps
*Feb 11 06:11:25.809: CLNT TEST C8/1 is down for apps
*Feb 11 06:11:25.813: cr10k_ipc_notify_close_conn_event -> Notifying client of IPC Port
CLOSED for Slot 8/1, RP-CLC
*Feb 11 06:11:25.813: cr10k_ipc_remove_session -> Start calling get session instance for
slot 8/1
*Feb 11 06:11:25.813: %IPCOIR-3-TIMEOUT: Timeout waiting for a response from slot 8/1.
plfm-10k-4#
*Feb 11 06:11:25.813: %IPCOIR-2-CARD_UP_DOWN: Card in slot 8/1 is down. Notifying
5cable-mc520h-d driver.
```

Related Commands

|                        |                                                                           |
|------------------------|---------------------------------------------------------------------------|
| logging cmts ipc-cable | Enables debug logging for the cable IPC software.                         |
| show cmts ipc-cable    | Displays information about the cable IPC layer on the Cisco CMTS routers. |

# debug cmts ipc-cable client

To debug the client cable inter-processor communication (IPC) software, use the **debug cmts ipc-cable client** command from the Privileged EXEC mode. To disable the debug flag, use the **no** form of the command.

```
debug cmts ipc-cable client {all |
 client client-id cid
 entity client-id cid entity-id eid |
 session client-id cid entity-id eid slot slot subslot subslot |
 message client-id cid entity-id eid message-type mtype |
 packing client-id cid entity-id eid packing-type ptype}

no debug cmts ipc-cable client {all |
 client client-id cid
 entity client-id cid entity-id eid |
 session client-id cid entity-id eid slot slot subslot subslot |
 message client-id cid entity-id eid message-type mtype |
 packing client-id cid entity-id eid packing-type ptype}
```

| Syntax Description                 |  |                                                                                                      |
|------------------------------------|--|------------------------------------------------------------------------------------------------------|
| <b>all</b>                         |  | Displays all information about IPC for all the clients including base layer IPC information.         |
| <b>client</b>                      |  | Displays the specified client-related IPC information including base layer IPC information.          |
| <b>entity</b>                      |  | Displays the IPC information of the entity, including base layer IPC information.                    |
| <b>session</b>                     |  | Displays the IPC information related to the specified session, including base layer IPC information. |
| <b>message</b>                     |  | Displays the IPC information related to the particular message type.                                 |
| <b>packing</b>                     |  | Displays the IPC information related to this type of packing message.                                |
| <b>client-id</b> <i>cid</i>        |  | Specifies the client ID of the cable IPC layer. The valid client ID range is from 0 to 8.            |
| <b>entity-id</b> <i>eid</i>        |  | Specifies the entity ID of the cable IPC layer. The valid entity ID range is from 0 and 2.           |
| <b>slot</b> <i>slot</i>            |  | Specifies the cable interface slot. The valid range is from 5 to 8.                                  |
| <b>subslot</b> <i>subslot</i>      |  | Specifies the cable interface subslot. The valid values are 0 and 1.                                 |
| <b>message type</b> <i>mtype</i>   |  | Specifies the message-type. The valid value is decided by the client and entity.                     |
| <b>packaging type</b> <i>ptype</i> |  | Specifies the packing-type. The valid values are 0 and 1.                                            |

**Command Default** Debug is disabled.

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SCF | This command was introduced. |

**Usage Guidelines** Each debug log has a debug-enable flag that is set by the **debug cmts ipc-cable** command. Each cable IPC debug log has a severity level. The **logging cmts ipc-cable** command allows you to selectively enable cable IPC debug logs based on the log severities. A debug log is recorded only if its severity is equal to or higher than the configured log-level, and if its debug enable flag is set.

**Examples** The following example shows the client PLFM entity of the route processor-cable line card (RP-CLC) session in the logging message:

```
Router# debug cmts ipc-cable client session client-id 4 entity-id 0 slot 5 subslot 0
Router# show cable modem

*Feb 11 07:33:50.628: cr10k_plfm_rsv_buf_guts(): Start C5/0 T=17 SVC=0 L=1612
*Feb 11 07:33:50.628: cr10k_plfm_rsv_buf_guts(): Done
*Feb 11 07:33:50.628: cr10k_plfm_get_unit_ptr(): start B=0x128862D4 Bv=1 Br=0)
*Feb 11 07:33:50.628: cr10k_plfm_get_unit_ptr(): done(P=0xC0E2ACD0)
*Feb 11 07:33:50.628: cr10k_plfm_tx_req_w_rsp(): Start C5/0 T1=17
*Feb 11 07:33:50.628: cr10k_plfm_xform(): Start C5/0 T1=17 Tx=1
*Feb 11 07:33:50.628: cr10k_plfm_get_unit_ptr(): start B=0x128862D4 Bv=1 Br=0)
*Feb 11 07:33:50.628: cr10k_plfm_get_unit_ptr(): done(P=0xC0E2ACD0)
*Feb 11 07:33:50.628: cr10k_plfm_issu_xform_guts() C5/0 T17: p=0xC0E2ACD0
*Feb 11 07:33:50.628: cr10k_plfm_issu_xform_guts() C5/0 T17: xmit xform ok
*Feb 11 07:33:50.628: cr10k_plfm_get_unit_ptr(): start B=0x128862D4 Bv=1 Br=0)
*Feb 11 07:33:50.628: cr10k_plfm_get_unit_ptr(): done(P=0x0)
*Feb 11 07:33:50.628: cr10k_ipc_send_rpc_message_blocked -> Sending blocking message for
client 4 session 5/0
*Feb 11 07:33:50.628: cr10k_message_dump_msg_buffer -> dump buffer size = 1668, client_id
= 4
*Feb 11 07:33:50.628: Dump before RPC blocking send:
*Feb 11 07:33:50.628: 0x0000: 00 00 28 0C 04 03 02 02 06 6C 00 18 05 00 05 00
*Feb 11 07:33:50.628: 0x0010: 52 50 00 01 00 01 00 00 00 0C 80 04 06 64 00 08
*Feb 11 07:33:50.628: 0x0020: 00 0C 06 58 00 01 00 00 00 00 00 00 0C 06 4C
*Feb 11 07:33:50.628: 0x0030: 00 00 00 00 00 00 00 00 11 10 1C 00 25 44 73 62 88
*Feb 11 07:33:50.628: 0x0040: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.628: 0x0050: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.628: 0x0060: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0070: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0080: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0090: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x00A0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x00B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x00C0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x00D0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x00E0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x00F0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0100: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0110: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

```
*Feb 11 07:33:50.632: 0x0120: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0130: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0140: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0150: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0160: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0170: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0180: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0190: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x01A0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x01B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x01C0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x01D0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x01E0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x01F0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.632: 0x0200: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.636: 0x0610: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.636: 0x0620: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.636: 0x0630: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.640: 0x0640: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.640: 0x0650: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.640: 0x0660: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.640: 0x0670: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
*Feb 11 07:33:50.640: 0x0680: 00 0F 0F 0F
*Feb 11 07:33:50.640: cr10k_ipc_send_rpc_message_blocked -> RPC blocking message for
client 4 session 5/0 has sent successfully
*Feb 11 07:33:50.640: cr10k_plfm_tx_req_w_rsp() Inf: Done S=0
*Feb 11 07:33:50.640: cr10k_ipc_free_buffer -> Done deallocating IPC buffer for client 4.
Now pending count = 0
```

The following example shows the debug logging message:

```
Router# debug cmts ipc-cable client message client-id 7 entity-id 0 message-type 12
Router# test cmts ipc-cable client test nonblocked 5/0

TEST IPC-CABLE TEST APIs: nonblocked tx/rx
*Feb 11 07:52:11.364: cr10k_clnt_hdr: pack type(0), hdr len(12), msgs (1), total pyld(28)
*Feb 11 07:52:11.364: cr10k_clnt_payload:
*Feb 11 07:52:11.364: 0x0000: 00 0C 00 10 00 00 00 00 00 00 00 0C 00 01 02 03
*Feb 11 07:52:11.364: 0x0010: 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
*Feb 11 07:52:11.364: cr10k_ipc_send_ipc_message_nonblocked -> Sending non-blocking
message for client 7 session 5/0
*Feb 11 07:52:11.364: cr10k_message_dump_msg_buffer -> dump buffer size = 72, client_id =
7
*Feb 11 07:52:11.364: Dump before IPC nonblocking send:
*Feb 11 07:52:11.364: 0x0000: 00 00 28 0C 04 03 02 02 00 30 00 18 05 00 05 00
*Feb 11 07:52:11.364: 0x0010: 52 50 00 02 00 01 00 00 00 0C 80 07 00 28 00 08
*Feb 11 07:52:11.364: 0x0020: 00 0C 00 1C 00 01 00 00 00 00 00 00 00 0C 00 10
*Feb 11 07:52:11.364: 0x0030: 00 00 00 00 00 00 00 00 0C 00 01 02 03 04 05 06 07
*Feb 11 07:52:11.364: 0x0040: 08 09 0A 0B 0C 0D 0E 0F
*Feb 11 07:52:11.364: cr10k_ipc_send_ipc_message_nonblocked -> IPC non-blocking message
for client 7 session 5/0 has sent successfully
*Feb 11 07:52:11.364: cr10k_ipc_free_buffer -> Done deallocating IPC buffer for client 7.
Now pending count = 0
*Feb 11 07:52:11.364: cr10k_ipc_send_req_status_notify_inline -> Message sent to slot 5/0
for client 7 has ack. Msg Len = 40
TEST IPC-CABLE TEST APIs: OK!
```

The following example shows the PNEGO client and RP-CLC entity logging message:

**Note**

When entity logging is enabled, all session, message, and packaging logging messages for that entity are enabled.

```
Router# debug cmts ipc-cable client entity client 3 entity-id 0

*Feb 11 08:02:42.708: cr10k_pnego_get_buf_guts() L317 C5/1 T20: Start L=0 SVC=704
*Feb 11 08:02:42.708: cr10k_pnego_get_buf_guts() L374 C5/1 T20: Done
*Feb 11 08:02:42.708: cr10k_pnego_get_data_ptr_guts() L609 T20: start B=0x12886654 Bv=1 Br=0)
*Feb 11 08:02:42.708: cr10k_pnego_get_data_ptr_guts() L621 T20: done(P=0xC0DBC5F0)
*Feb 11 08:02:42.708: cr10k_pnego_tx_urgent_req() L756 C5/1 T20: Start
*Feb 11 08:02:42.708: cr10k_pnego_xform() L668 C5/1 T20: Start Tx=1
*Feb 11 08:02:42.708: cr10k_pnego_get_data_ptr_guts() L609 T20: start B=0x12886654 Bv=1 Br=0)
*Feb 11 08:02:42.708: cr10k_pnego_get_data_ptr_guts() L621 T20: done(P=0xC0DBC5F0)
*Feb 11 08:02:42.708: cr10k_pnego_issu_xform_guts() L657 C5/1 T20: p=0xC0DBC5F0
*Feb 11 08:02:42.708: cr10k_pnego_issu_xform_guts() L701 C5/1 T20: xmit xform ok
*Feb 11 08:02:42.708: cr10k_pnego_get_data_ptr_guts() L609 T20: start B=0x12886654 Bv=1 Br=0)
*Feb 11 08:02:42.708: cr10k_pnego_get_data_ptr_guts() L621 T20: done(P=0x0)
*Feb 11 08:02:42.708: cr10k_ipc_send_ipc_message_urgent -> Sending non-blocking message for client 3 session 5/1
*Feb 11 08:02:42.708: cr10k_message_dump_msg_buffer -> dump buffer size = 760, client_id = 3
```

The following example shows the debugging message when the TEST client is enabled:

```
Router# debug cmts ipc-cable client client-id 7
Router# test cmts ipc-cable client test blocked 8/0

TEST IPC-CABLE TEST APIs: blocked tx/rx
*Feb 11 08:08:29.128: test_cr10k_clnt_test_blocked() Info: Start(C=8/0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_req_buf(): start(C8/0 typ=10 svc=0 len=16)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_req_buf(): done
*Feb 11 08:08:29.128: cr10k_clnt_test_get_ptr(): start(B=0x12886A20 Bv=1 Br=0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_ptr(): done(P=0xC0D4BA50)
*Feb 11 08:08:29.128: cr10k_clnt payload:
*Feb 11 08:08:29.128: 0x0000: 00 0C 00 10 00 00 00 00 00 00 00 00 0A 00 01 02 03
*Feb 11 08:08:29.128: 0x0010: 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
*Feb 11 08:08:29.128: cr10k_clnt_test_send_blocked(): start(C8/0 MC=0 TL=16571 T1=10 L1=16 B=0x12886A20)
*Feb 11 08:08:29.128: cr10k_clnt_test_xform(): Start C8/0 T1=10 Tx=1
*Feb 11 08:08:29.128: cr10k_clnt_test_get_first_data_ptr(): start(B=0x12886A20 Bv=1 Br=0 Bh=0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_first_data_ptr(): done(P=0xC0D4BA50)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_next
plfm-10k-4#_data_ptr(): start(B=0x12886A20 Bv=1 Br=0 Bh=0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_next_data_ptr(): done(P=0x0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_first_data_ptr(): start(B=0x12886A20 Bv=1 Br=0 Bh=0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_first_data_ptr(): done(P=0xC0D4BA50)
*Feb 11 08:08:29.128: cr10k_clnt_hdr: pack type(0), hdr len(12), msgs (1), total pyld(28)
*Feb 11 08:08:29.128: cr10k_clnt payload:
*Feb 11 08:08:29.128: 0x0000: 00 0C 00 10 00 00 00 00 00 00 00 00 0A 00 01 02 03
*Feb 11 08:08:29.128: 0x0010: 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
*Feb 11 08:08:29.128: cr10k_ipc_send_rpc_message_blocked -> Sending blocking message for client 7 session 8/0
*Feb 11 08:08:29.128: cr10k_message_dump_msg_buffer -> dump buffer size = 72, client_id = 7
*Feb 11 08:08:29.128: Dump before RPC blocking send:
```



```
*Feb 11 08:08:29.128: 0x0000: 00 00 28 0C 04 03 02 02 00 30 00 18 08 00 08 00
1 00 00 00 0C 80 07 00 28 00 08 50 00 01 00 0
*Feb 11 08:08:29.128: 0x0020: 00 0C 00 1C 00 01 00 00 00 00 00 00 0C 00 10
*Feb 11 08:08:29.128: 0x0030: 00 00 00 00 00 00 00 0A 00 01 02 03 04 05 06 07
*Feb 11 08:08:29.128: 0x0040: 08 09 0A 0B 0C 0D 0E 0F
*Feb 11 08:08:29.128: cr10k_ipc_send_rpc_message_blocked -> RPC blocking message for
client 7 session 8/0 has sent success
*Feb 11 08:08:29.128: cr10k_clnt_test_get_bndl_payload_size(): start(B=0x12886AB4 Bv=1
Br=1 Bh=0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_bndl_payload_size(): done(16)
*Feb 11 08:08:29.128: cr10k_clnt_test_xform(): Start C8/0 T1=11 Tx=0
*Feb 11 08:08:29.128: cr10k_clnt_test_get_first_data_ptr(): start(B=0x12886AB4 Bv=1 Br=1
Bh=0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_first_data_ptr(): done(P=0xC014AB0C)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_next_data_ptr(): start(B=0x12886AB4 Bv=1 Br=1
Bh=0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_next_data_ptr(): done(P=0x0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_first_data_ptr(): start(B=0x12886AB4 Bv=1 Br=1
Bh=0)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_first_data_ptr(): done(P=0xC014AB0C)
*Feb 11 08:08:29.128: cr10k_clnt_test_send_blocked(): done(REQ B=0x12886A20 RSP S=0 MC=1
TL=16 T1=11 L1=16 B=0x12886AB4)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_ptr(): start(B=0x12886AB4 Bv=1 Br=1)
*Feb 11 08:08:29.128: cr10k_clnt_test_get_ptr(): done(P=0xC014AB0C)
*Feb 11 08:08:29.128: cr10k_clnt_test_free_buf(): B=0x12886AB4
*Feb 11 08:08:29.128: cr10k_ipc_free_buffer -> Done deallocating IPC buffer for client 7.
Now pending count = 0
*Feb 11 08:08:29.128: test_cr10k_clnt_test_blocked() Info: Done(1)
TEST IPC-CABLE TEST APIs: OK!
```

## Related Commands

|                               |                                                                           |
|-------------------------------|---------------------------------------------------------------------------|
| <b>logging cmts ipc-cable</b> | Enables debug logging for the cable IPC software.                         |
| <b>show cmts ipc-cable</b>    | Displays information about the cable IPC layer on the Cisco CMTS routers. |

# debug cpd

To debug the CPD feature, use the **debug cpd** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

- debug cpd verbose**
- no debug cpd verbose**

|                    |                                                                    |
|--------------------|--------------------------------------------------------------------|
| Syntax Description | <b>verbose</b> (Optional) Displays detailed debugging information. |
|--------------------|--------------------------------------------------------------------|

|                 |                                                                            |
|-----------------|----------------------------------------------------------------------------|
| Command Default | Debug is disabled and CPD request and response messages are not displayed. |
|-----------------|----------------------------------------------------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.3(21a)BC3   | This command was introduced. |

|          |                                                                                                    |
|----------|----------------------------------------------------------------------------------------------------|
| Examples | The following example shows enabling the <b>debug cpd</b> command:<br><br>Router# <b>debug cpd</b> |
|----------|----------------------------------------------------------------------------------------------------|

|                  |                |                    |
|------------------|----------------|--------------------|
| Related Commands | <b>Command</b> | <b>Description</b> |
|                  | <b>cpd</b>     | Enables CPD.       |

## debug cr10k-rp

To enable debugging of the subsystems on the active Performance Routing Engine (PRE1) module on the Cisco uBR10012 router, use the **debug cr10k-rp pkt** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug cr10k-rp** [**cli** | **drv** | **ha-all** | **ha-error** | **ha-msg** | **ha-recovery** | **ha-timing** | **ipc** | **oir** | **pkt** [**conditional** [**peek** *byte*] ] | **sid** | **spec**]

**no debug cr10k-rp** [**cli** | **drv** | **ha-all** | **ha-error** | **ha-msg** | **ha-recovery** | **ha-timing** | **ipc** | **oir** | **pkt** [**conditional** [**peek** *byte*] ] | **sid** | **spec**]

| Syntax Description      |                                                                                                                                                                                                                          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cli</b>              | (Optional) Displays debugging messages for the command-line interface (CLI) commands run on the processor.                                                                                                               |
| <b>drv</b>              | (Optional) Displays debugging messages for the processor's driver software.                                                                                                                                              |
| <b>ha-all</b>           | (Optional) Displays debugging messages related to High Availability (HA) redundancy events.                                                                                                                              |
| <b>ha-error</b>         | (Optional) Displays debugging messages about errors related to the recovery of cable modems during HA switchovers.                                                                                                       |
| <b>ha-msg</b>           | (Optional) Displays debugging messages for HA bulk synchronization operations.                                                                                                                                           |
| <b>ha-recovery</b>      | (Optional) Displays debugging messages related to the recovery operations for cable modems after HA switchovers. In particular, these messages concern the recovery of high-priority cable modems that have voice calls. |
| <b>ha-timing</b>        | (Optional) Displays debugging messages related to HA timing events.                                                                                                                                                      |
| <b>ipc</b>              | (Optional) Displays debugging messages for the processor's interprocess communications (IPC) system.                                                                                                                     |
| <b>oir</b>              | (Optional) Displays debugging messages for online insertion and removal (OIR) operations.                                                                                                                                |
| <b>pkt</b>              | (Optional) Displays debugging messages for the packets that the PRE1 module processes.                                                                                                                                   |
| <b>conditional</b>      | (Optional) Enables conditional debugging for the packets processed by the PRE1 module.                                                                                                                                   |
| <b>peek</b> <i>byte</i> | (Optional) Specifies that debugging should show the value for a specific byte in each packet processed by the PRE. The valid range for <i>byte</i> is 1 to 120.                                                          |
| <b>sid</b>              | (Optional) Displays debugging messages for the service IDs (SIDs) processed by the PRE1 module.                                                                                                                          |
| <b>spec</b>             | (Optional) Displays debugging messages for spectrum management operations.                                                                                                                                               |

**Command Modes** Privileged EXEC

**Command History**

| Release     | Modification                                                                                                                              |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(4)BC1  | This command was introduced for the Cisco uBR10012 universal broadband router.                                                            |
| 12.2(11)BC2 | The <b>conditional</b> and <b>peek</b> options were added for the <b>pkt</b> keyword.                                                     |
| 12.2(11)BC3 | The <b>ha-all</b> , <b>ha-msg</b> , and <b>ha-timing</b> options were added to support High-Availability N+1 (1:n) redundancy operations. |

**Usage Guidelines**

The **debug cr10k-rp pkt** command enables debugging of the different subsystems that are active on the PRE1 modules in the Cisco uBR10012 router. You can perform general debugging by giving the command without any options, or you can limit the debugging output to a specific subsystem by specifying one of the optional keywords.

In Cisco IOS Release 12.2(11)BC2 and later releases, you can use the **conditional** option, together with the **debug cable mac-address** and **debug cable interface** commands, to display information about selected packets. The command will display only those packets that match the specified cable interface or MAC address options.

Together with the **conditional** option, you can also optionally specify the **peek** keyword to create specifically match only those packets that contain a matching MAC address at the specified location in the datagram. This can be useful for examining certain types of packets, such as DHCP or ARP packets.

**Examples**

The following example shows typical output for CLI debugging messages:

```
Router# debug cr10k-rp cli
```

```
CR10K RP debug CLI debugging is on
```

```
Failed setting clock for slot 2, subunit 1
SNMP Info download failed for slot 2, subunit 1
Config change command for unknown interface!!!
```

The following example shows typical output for IPC debugging messages:

```
Router# debug cr10k-rp ipc
```

```
CR10K RP debug IPC debugging is on
```

```
plugin_card__c10k_sch_card_event: hwidb=Cable8/1/0 if_num=0 event=6
```

```
00:03:14: clc_if_stats_event: If stats from Ca8/1/0
```

```
00:03:14: Merge: on Ca8/1/0
```

```
00:03:14: Outputs Tot_Outs TotTxBytes
```

```
00:03:14: RP 0 40 7103
```

```
00:03:14: SIC 0 0 0
```

```
00:03:14: LC 0 40 7103
```

```
plugin_card__c10k_sch_card_event: hwidb=Cable8/1/1 if_num=1 event=6
```

```
00:03:14: clc_if_stats_event: If stats from Ca8/1/1
```

```
00:03:14: Merge: on Ca8/1/1plugin_card__c10k_sch_card_event: hwidb=Cable6/0/0 if_num=0
event=6
```

```
00:03:15: clc_if_stats_event: If stats from Ca6/0/0
```

```
00:03:15:
```

```
Merge: on Ca6/0/0
```

```
00:03:15: Outputs Tot_Outs TotTxBytes
```

```
00:03:15: RP 0 0 0
00:03:15: SIC 0 0 0
00:03:15: LC 0 0 0
```

The following example shows typical output for IPC debugging messages when you are shutting down and reenabling a cable interface:

```
Router# debug cr10k-rp ipc
```

```
CR10K RP debug IPC debugging is on
```

```
Router# configure terminal
```

```
Router(config)# interface c6/0/0
```

```
Router(config-if)# shutdown
```

```
schrp_cli_cmd: slot=6 subunit=100 slotunit=8 cmdtype=101F
c10k_card_send_nbcmd_eventrsp: nbcmd_id=0x611CE998 hwidb=6B3DF60
plugin_card__c10k_sch_card_event: hwidb=0x6B3DF60 interface_num=0 event=4096
sch_handle_sch_event: erso_type=0x1001
sch_handle_sch_rp_cfg_ersp(): hwidb=0x6B3DF60 msg_size=0x0 0x78 ersp_size=0x0 0x78
type=0x1001
plugin_card__c10k_sch_card_event: hwidb=0x6B3DF60 interface_num=0 event=4
c10k_sch_link_state_event: hwidb=0x6B3DF60 unit=0 seq=34 reason=2 event_state=1
```

```
Router(config-if)# no shutdown
```

```
Router(config-if)#schrp_cli_cmd: slot=6 subunit=100 slotunit=8 cmdtype=101F
schrp_cli_cmd: SCH_API_CMD_GET_INIT_DS hwidb=6B3DF60
c10k_card_send_nbcmd_eventrsp: nbcmd_id=0x611CE998 hwidb=6B3DF60
plugin_card__c10k_sch_card_event: hwidb=0x6B3DF60 interface_num=0 event=4096
sch_handle_sch_event: erso_type=0x1001
sch_handle_sch_rp_cfg_ersp(): hwidb=0x6B3DF60 msg_size=0x0 0x950 ersp_size=0x0 0x950
type=0x1001
c10k_card_send_nbcmd_eventrsp: nbcmd_id=0x611CE998 hwidb=6B3DF60
plugin_card__c10k_sch_card_event: hwidb=0x6B3DF60 interface_num=0 event=4096
sch_handle_sch_event: erso_type=0x1001
sch_handle_sch_rp_cfg_ersp(): hwidb=0x6B3DF60 msg_size=0x0 0x20 ersp_size=0x0 0x20
type=0x1001
plugin_card__c10k_sch_card_event: hwidb=0x6B3DF60 interface_num=0 event=4
c10k_sch_link_state_event: hwidb=0x6B3DF60 unit=0 seq=35 reason=2 event_state=1
```

The following example shows a typical display for the **debug cr10k-rp pkt conditional** command, which displays packets for SID 2 on cable interface 6/1/0:

```
Router# debug cable interface c6/1/0 sid 2
```

```
Router# debug cr10k-rp pkt conditional
```

```
Router# show debug
```

```
CR10K PACKET:
```

```
 Dump cr10k packets to/from RP conditionally
```

The following example shows how to enable conditional debugging of packets, displaying only those packets that contain the desired mac address at byte 92 in the datagram:

```
Router# debug cr10k-rp pkt conditional peek 92
```

```
Router# debug cable interface c6/1/0 mac-address 00C0.abcd.ef00
```

```
Router# show debug
```

```
CR10K PACKET:
```

```
 Dump cr10k packets to/from RP conditionally
```

```
 Additionally, peeking inside transmitted pkts at offset 92
```

Both types of packet debugging generate output similar to the following example:

```
Jun 19 13:07:32.316: RPTX: Using Downstream Service Flow ID : 16939, SID : 2 V5
```

```

Jun 19 13:07:32.316: RPTX to Cobalt: 0x801B634, size=111
006F0000 00057010 422B2488 00020000 10000006 10000010 950701DB 00016440
D1420800 4500004B 2B260000 FF11187A A4789781 A478978F CD7E00A1 0037D2CA
302D0201 00040670 75626C69 63A02002 03062B27 02010002 01003013 3011060D
....

Jun 19 13:07:32.316: RPTX: Using Downstream Service Flow ID : 16939, SID : 2 V5
Jun 19 13:07:32.316: RPTX to Cobalt: 0x8023834, size=111
006F0000 00057010 422B2488 00020000 10000006 10000010 950701DB 00016440
D1420800 4500004B 2B270000 FF111879 A4789781 A478978F CD7E00A1 0037D2CB
302D0201 00040670 75626C69 63A02002 03062B28 02010002 01003013 3011060D
....

```

Table 0-274 explains the information contained in the display for each packet:

**Table 0-274** *debug cr10k-rp pkt Field Descriptions*

| Field                                  | Description                                                                                                                                                 |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RPIX: Using Downstream Service Flow ID | Displays the service flow ID (SFID) for this packet.                                                                                                        |
| SID                                    | Displays the service ID (SID) for this packet.                                                                                                              |
| RPTX or RPRX                           | Displays whether this packet is transmitted (RPTX) or received (RPRX) by the processor.                                                                     |
| Size                                   | Displays the size of the packet's datagram in decimal.                                                                                                      |
| Packet Dump                            | Displays the first 96 bytes of the packet's datagram in hexadecimal. The command then displays an ellipses (. . .) if the datagram is larger than 96 bytes. |

The following example shows typical output for SID debugging messages:

```

Router# debug cr10k-rp sid

CR10K RP debug SID debugging is on

(Cable 6/1/0:2): CM Offline - MAC 00C0.1234.5678, SID 113
(Cable 6/1/0:2): -Shutdown CM- SID 231
(Cable 6/1/0:2): CM Shutdown - MAC 00C0.2210.a01c, SID 231
(Cable 6/1/0:2): CM Remove - MAC 00C0.2210.a01c, SID 231
Call SID replace with old IP addr 10.10.13.18 new IP addr 10.10.13.121
(Cable 5/1/1:1) - New CM 00C0.1122.bcab, SID 396
(Cable 5/1/0:1) - New CM 00C0.8723.11F0, SID 397
(Cable 5/1/0:1) - CM Init FAILED - MAC 00C0.8723.11F0, SID 397

```

The following example shows typical output for spectrum management debugging messages for a particular interface:

```

Router# debug cable interface c6/1/0 sid 2
Router# debug cr10k-rp pkt spec

CR10K RP debug Spectrum debugging is on

(Cable 5/0/0:4) Release frequency (11600000, 3200000) from group 12
(Cable 5/0/0:4) Frequency request (10000000 - 13200000) from group 12 approved
(Cable 7/0/0:1) Frequency request (12000000 - 13600000) from group 2 approved
(Cable 7/0/0:1) Release frequency (12800000, 1600000) from group 2
(Cable 7/0/0:1) Frequency request (12000000 - 15200000) from group 2 approved
(Cable 7/0/0:2) Frequency request (20000000 - 21600000) from group 22 approved
(Cable 7/0/0:2) Release frequency (20800000, 1600000) from group 22

```

```
(Cable 7/0/0:2) Frequency request (20000000 - 23200000) from group 22 approved
(Cable 7/0/0:3) Frequency request (20000000 - 21600000) from group 22 approved
(Cable 7/0/0:3) Release frequency (20800000, 1600000) from group 22
(Cable 7/0/0:4) Release frequency (20800000, 1600000) from group 22
(Cable 7/0/0:4) Frequency request (20000000 - 20400000) from group 22 approved
(Cable 7/0/0:5) Frequency request (20000000 - 21600000) from group 22 approved
(Cable 7/0/0:5) Release frequency (20800000, 1600000) from group 22
(Cable 7/0/0:5) Frequency request (20000000 - 20200000) from group 22 approved
(Cable 7/0/0:6) Frequency request (20000000 - 21600000) from group 22 approved
Release frequency request sent to slot 7 subslot 0
(Cable 7/0/0:6) Frequency request (21400000 - 21800000) from group %d rejected because of
overlapping band
```

The following lists the typical messages that are displayed by the **ha-all** option.

```
PRE Redundancy: failed to get RF buf to send msg to peer
PRE Redundancy: failed to send RF buf to peer
PRE REDUNDANCY: bulk sync in progress
PRE REDUNDANCY: Got RF message when not in Active state.
RP DS SRV FLOW packet sanity check... ok.
Failed to find DS SF with sfid 321
Deleting an old inter_rp_ds_srv_flow
Adding a new inter_rp_ds_srv_flow
Updating an inter_rp_ds_srv_flow
Processing inter_rp_ds_srv_flow
cr10k_rp_ha_parse_sync: Received Packet of 122 len
cr10k_rp_ha_parse_sync:Received
Synching cm instance
CR10K HA: Standby recv chkpt msg
PRE REDUNDANCY: NO Resources
PRE REDUNDANCY: RF_PROG_STANDBY_BULK received
PRE REDUNDANCY:This is standby from boot
PRE REDUNDANCY: RF_PROG_ACTIVE_FAST received
```

The following example shows the typical messages for the **ha-timing** option. These messages show the total time it takes to synchronize all of the cable modems on a cable interface after a switchover, as well as the total time it takes for all cable modems to recover and come online. These messages also show the total time it took the HCCP and DOCSIS protocol subsystems to synchronize after a switchover.

```
Router# debug cable interface c6/1/0
Router# debug cr10k-rp ha-timing

CR10K RP debug High Availability timing

PRE_HA: c6/1/0 Total modems 234 bulk sync'ed in 531 msec
 (delay: 20 msec; CM's per loop:10)
PRE_HA: c6/1/0 Total modems (234) recovered in 1124 msec
PRE_HA: Completed hccp bulksync in 335 msec
PRE_HA: Completed docsis bulksync in 751 msec
```

The following example shows the typical messages for the **ha-msg** option. These messages show the total time it takes to synchronize all of the cable modems on a cable interface after a switchover, as well as the total time it takes for all cable modems to recover and come online. These messages also show the total time it took the HCCP and DOCSIS protocol subsystems to synchronize after a switchover.

```
Router# debug cable interface c6/1/0
Router# debug cr10k-rp ha-msg

CR10K RP debug High Availability msg

PRE_HA_BUGMSG
PRE REDUNDANCY: Bulk sync completed
PRE REDUNDANCY: Recv bulk sync complete - sending ack
```

```
PRE_REDUNDANCY: Send bulk sync ack failed
PRE_RF: Waiting for bulk sync ack
PRE_REDUNDANCY: Bulk sync completed
PRE_REDUNDANCY: Recv bulk sync complete - sending ack
PRE_REDUNDANCY: Send bulk sync ack failed
PRE_RF: Waiting for bulk sync ack
```

The following example shows the typical messages for the **ha-recovery** option. The following messages show the typical recovery process, in which cable modems with active voice calls are recovered first. After these cable modems are online, the remaining, data-only cable modems are recovered.

```
PRE_RECOVERY: <Cable I/F> Received message to recover voice
PRE_RECOVERY: Suspending recovery until higher priority modems are recovered
PRE_RECOVERY: All interfaces recovered. Killing the voice process
PRE_RECOVERY: No events in voice queue. Allow data modems to recover
PRE_RECOVERY: <Cable I/F> Resume data recovery after suspend (modems recovered <# of CMs>)
PRE_RECOVERY:<Cable I/F> Received message to recover data
PRE_RECOVERY: All interfaces recovered. Killing the data process
```

The following are possible messages that can be displayed because of potential error conditions:

```
PRE_RECOVERY:<Cable I/F> No modems to be recovered
PRE_HA:<Cable I/F> Unable to start the voice recovery process
PRE_HA: <Cable I/F> Unable to start the data recovery process
```

Related Commands

| Command                        | Description                                                                       |
|--------------------------------|-----------------------------------------------------------------------------------|
| <b>debug cable interface</b>   | Enables debugging on a specific cable interface.                                  |
| <b>debug cable mac-address</b> | Enables debugging for a specific CM, as identified by its hardware (MAC) address. |



# debug cr10k-rp dbs-queue

To display debug information for dynamic bandwidth sharing (DBS) on the Cisco uBR10012 universal broadband router, use the **debug cr10k-rp dbs-queue** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug cr10k-rp dbs-queue**

**no debug cr10k-rp dbs-queue**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.3(23)BC1 | This command was introduced.                                    |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. |

**Usage Guidelines** The **debug cr10k-rp dbs-queue** command is used only with the Cisco uBR10012 universal broadband router.



**Note**

Routine use of the debug cr10k-rp dbs-queue command is not recommended. If you require further information, contact Cisco technical assistance at <http://www.cisco.com/techsupport>.

**Examples** The following example shows that the debug option has been turned on using the **debug cr10k-rp dbs-queue** command :

```
Router# debug cr10k-rp dbs-queue
CR10K RP debug dynamic BG link queue setup debugging is on
```

| Related Commands | Command                          | Description                                                                                                 |
|------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------|
|                  | <b>cable dynamic-bw-sharing</b>  | Enables dynamic bandwidth sharing on a specific modular cable or wideband cable interface.                  |
|                  | <b>show pxf cable controller</b> | Displays information about the RF channel Versatile Traffic Management System (VTMS) links and link queues. |
|                  | <b>show pxf cpu queue</b>        | Displays parallel express forwarding (PXF) queueing and link queue statistics.                              |

# debug docsis ssid

To display debugging information about the parsing and verification of the DOCSIS code verification certificates (CVCs) that are part of a software image downloaded with the Secure Software Download (SSD) procedure, use the **debug docsis ssid** command in privileged EXEC mode. To disable the debugging output, use the **no** form of this command.

Cisco uBR905 and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter

**debug docsis ssid**  
  
**no debug docsis ssid**

**Syntax Description**    This command has no arguments or keywords.

**Command Modes**    Privileged EXEC

| Command History | Release    | Modification                                                                                                                      |
|-----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)CZ | This command was introduced for the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter. |

**Usage Guidelines**    This command displays whether the Secure Software Download procedure could validate the manufacturer’s CVC and optional cosigner’s CVC (if present) that are part of the downloaded software image.

**Examples**    The following example shows typical output for a successful Secure Software Download procedure for a software image that has been signed by both the manufacturer and by a cosigner:

```
Router# debug docsis ssid

secure software download debugging is on
Router#
SSD: decrypt process suspended and continued
SSD: decrypt process suspended and continued
Code Verification Successful (Manufacturer CVC/CVS)
Verifying Co-Signer CVC/CVS
SSD: decrypt process suspended and continued
SSD: decrypt process suspended and continued
Co-signer CVC has been validated
Code Verification Successful (Co-Signer CVC/CVS)

Router#

If the manufacturer’s signature on the software image file cannot be validated using the manufacturer’s CVC on the router, the following messages are displayed:

MFG code signature does not validate
MFG CVC validation has failed
```

If the MSO cosigner's signature on the software image file cannot be validated using the cosigner's CVC on the router, the following messages are displayed:

```
Co-signer code signature does not validate
Co-signer CVC validation has failed
```

If the software image was signed either before or after the allowable time range specified as part of the manufacturer's CVC, one of the following messages is displayed:

```
signingTime is before saved codeAccessStart
signingTime is before CVC validNotBefore
signingTime is after CVC validNotAfter
CVC validity start is less than save cvcAccessStart
```

**Related Commands**

| Command                | Description                                                                                                                |
|------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>docsis cvc mfg</b>  | Configures the access start times and organization name for the manufacturer's code verification certificate (CVC).        |
| <b>docsis cvc mso</b>  | Configures the access start times and organization name for the optional MSO cosigned code verification certificate (CVC). |
| <b>docsis cvc test</b> | Tests the root CA public key and CM private key that are installed on the router.                                          |

# debug ehsa

To enable debug information about enhanced high system availability (EHSA) activity, use the **debug ehsa** command in privileged EXEC mode. To disable debugging output for the EHSA module, use the **no** form of this command.

**debug ehsa {alarms | all | configsync | fsm | keepalive | peer-monitor | services | timesync}**

**no debug ehsa**

## Syntax

|                     |                                                                                                                            |
|---------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>alarms</b>       | Enables debugging of EHSA alarms.                                                                                          |
| <b>all</b>          | Enables all EHSA debugging types.                                                                                          |
| <b>configsync</b>   | Enables debugging of EHSA configuration synchronization.                                                                   |
| <b>fsm</b>          | Enables debugging of EHSA redundancy finite state machine (FSM).                                                           |
| <b>keepalive</b>    | Enables debugging of EHSA keepalive messages sent between the active Performance Routing Engine (PRE) and the standby PRE. |
| <b>peer-monitor</b> | Enables EHSA debugging messages for the standby PRE monitoring of the active PRE.                                          |
| <b>services</b>     | Enables debugging of EHSA services for the services requested during redundancy processing.                                |
| <b>timesync</b>     | Enables debugging of EHSA time synchronization procedures.                                                                 |

## Command Default

No default behavior or values.

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                              |
|-------------|-----------------------------------------------------------|
| 12.2(33)SCA | This command was introduced on the Cisco uBR10012 router. |

## Usage Guidelines

The **debug ehsa** command must be enabled on the active PRE and on the standby PRE to ensure that debug output after a switchover is displayed.

## Examples

The following example shows all debugging output during a switchover using the **all** keyword:

```
Router# debug ehsa all

Redundancy All debugging is on
router#
...

router# show log | inc EHSA
*Apr 6 04:43:53.007: EHSA: Process KEEPALIVE(30) bootstrap message.
*Apr 6 04:43:53.007: EHSA: Received keepalive
```

```
*Apr 6 04:43:53.007: EHSA: Sent keepalive
...

*Apr 6 04:43:55.423: EHSA: IPC message request-type SLAVE_SERVICES_OIR_EVENT_REQ(23)
*Apr 6 04:43:55.423: PEHSA:processing OIR event received from Active
...
*Apr 6 04:43:56.007: EHSA: Process KEEPALIVE(30) bootstrap message.
*Apr 6 04:43:56.007: EHSA: Received keepalive
*Apr 6 04:43:56.007: EHSA: Sent keepalive
...

*Apr 6 04:44:13.287: EHSA: Filter event raw-event=FORCE_SWITCHOVER(10), peer ehsa-states:

old=Unknown redundancy state(0) new=Unknown redundancy state(0)
*Apr 6 04:44:13.287: EHSA: Switching Standby to Active
*Apr 6 04:44:13.287: EHSA: Filter event raw-event=FORCE_SWITCHOVER(10), peer ehsa-states:

old=Unknown redundancy state(0) new=Unknown redundancy state(0)
*Apr 6 04:44:13.291: EHSA: Changing from IPC slave to IPC Master
*Apr 6 04:44:15.111: EHSA: Filter event raw-event=PEER_CRASHED(1), peer ehsa-states:

old=Unknown redundancy state(0) new=Unknown redundancy state(0)
*Apr 6 04:44:15.111: EHSA: Filter event raw-event=PEER_REDUNDANCY_STATE_CHANGE(5), peer

ehsa-states: old=ACTIVE(1) new=STANDALONE(3)
*Apr 6 04:44:16.535: EHSA: Exception dump to network is false
*Apr 6 04:44:16.535: EHSA: Created Parser Mode History for tty 0
*Apr 6 04:44:16.535: EHSA: Killing Peer monitor
*Apr 6 04:44:16.567: EHSA: Restarting Peer monitor
*Apr 6 04:44:16.567: EHSA: Asserting alarm : SWITCHOVER
*Apr 6 04:44:16.567: EHSA: state change, events: major=2 minor=0
*Apr 6 04:44:17.623: EHSA: Filter event raw-event=PEER_CRASHED(1), peer ehsa-states:

old=Unknown redundancy state(0) new=Unknown redundancy state(0)
*Apr 6 04:44:17.623: EHSA: Filter event raw-event=PEER_REDUNDANCY_STATE_CHANGE(5), peer

ehsa-states: old=ACTIVE(1) new=STANDALONE(3)
*Apr 6 04:44:25.707: EHSA: Filter event raw-event=PEER_REDUNDANCY_STATE_CHANGE(5), peer

ehsa-states: old=STANDALONE(3) new=STANDBY(2)
*Apr 6 04:44:33.259: EHSA: Created Parser Mode History for tty 2
*Apr 6 04:44:33.259: EHSA: csb(0x201A24B4), line(interface Cable5/1/0), old_mode2(NULL),

parser_mode(0x645B7CE8), mode(configure)
*Apr 6 04:44:33.259: EHSA: PRC csb->line (interface Cable5/1/0), old_mode2 (configure),

csb->mode (interface)
*Apr 6 04:44:33.259: EHSA: Parser mode history for ttynum 0, pmode_idx 0
*Apr 6 04:44:33.259: EHSA: Parser mode history for ttynum 2, pmode_idx 1
*Apr 6 04:44:33.259: EHSA: Parser mode history table population 2 of 1512
...

*Apr 6 04:44:33.263: EHSA: csb(0x201A24B4), line(default cable upstream 3 shutdown),

old_mode2(configure), parser_mode(0x645B7D54), mode(interface)
*Apr 6 04:44:33.263: EHSA: PRC csb->line (default cable upstream 3 shutdown), old_mode2

(interface), csb->mode (interface)
*Apr 6 04:44:33.263: EHSA: Parser mode history for ttynum 0, pmode_idx 0
*Apr 6 04:44:33.263: EHSA: Parser mode history for ttynum 2, pmode_idx 1
*Apr 6 04:44:33.263: EHSA: Parser mode history table population 2 of 1512
*Apr 6 04:44:33.267: EHSA: csb(0x201A24B4), line(default cable upstream 3
modulation-profile
```

**debug ehsa**

```
21), old_mode2(interface), parser_mode(0x645B7D54), mode(interface)

...

*Apr 6 04:48:41.355: EHSA: Sent keepalive
*Apr 6 04:48:43.007: EHSA: Process KEEPALIVE(30) bootstrap message.
...
```

**Related Commands**

| Command                 | Description                                                |
|-------------------------|------------------------------------------------------------|
| <b>redundancy</b>       | Forces the standby RP to assume the role of the active RP. |
| <b>force-switchover</b> |                                                            |

# debug hccp authentication

To display authentication debug messages for Hot Standby Connection-to-Connection (HCCP) groups, use the **debug hccp authentication** command in privileged EXEC mode. To disable HCCP authentication debug message output, use the **no** form of this command.

**debug hccp authentication**

**no debug hccp authentication**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Debug is disabled and authentication messages for HCCP groups are not displayed.

## Command Modes

Privileged EXEC (#)

## Command History

| Release                   | Modification                                                                    |
|---------------------------|---------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced.                                                    |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router.   |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router. |
| 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                        |

## Usage Guidelines

You must use the **debug hccp events** command before the **debug hccp authentication** command will generate any debug message output.

## Examples

The following example shows the additional N+1 redundancy authentication debug message output produced when the **debug hccp authentication** command has been activated:

```
Router# debug hccp events
Router# debug hccp authentication
```

```
Sep 7 09:51:50.151:HCCP 1 0->1:HELLO Learn tran 31708
Sep 7 09:51:50.151:auth md5 keyid 1 digest B77F65ED 1B38ED5C 87A7037B C006DAFB
```

## Related Commands

| Command                          | Description                                                                                                  |
|----------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>debug hccp channel-switch</b> | Displays debug messages related to an RF or channel switch that is being used for HCCP N+1 (1:n) redundancy. |
| <b>debug hccp events</b>         | Displays debug messages for all HCCP group interaction.                                                      |

| Command                    | Description                                                                                                   |
|----------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>debug hccp inter-db</b> | Displays debug messages for the inter-database events during HCCP operations.                                 |
| <b>debug hccp plane</b>    | Displays debug messages for HCCP-related messages sent between the router's control plane and data backplane. |
| <b>debug hccp sync</b>     | Displays debug messages for HCCP synchronization messages.                                                    |
| <b>debug hccp timing</b>   | Displays debug messages for the timing of HCCP events.                                                        |



# debug hccp channel-switch

To display debug messages related to a radio frequency (RF) or channel switch that is being used for Hot Standby Connection-to-Connection Protocol (HCCP) N+1 (1:n) redundancy, use the **debug hccp channel-switch** command in privileged EXEC mode. To disable the debug message output, use the **no** form of this command.

**debug hccp channel-switch**

**no debug hccp channel-switch**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Debug is disabled and channel switch messages are not displayed.

**Command Modes** Privileged EXEC (#)

| Command History | Release                   | Modification                                                                            |
|-----------------|---------------------------|-----------------------------------------------------------------------------------------|
|                 | 12.2(4)XF1,<br>12.2(4)BC1 | This command was introduced for the N+1 (1:n) RF Switch with the Cisco uBR10012 router. |
|                 | 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router.         |
|                 | 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                                |

**Usage Guidelines** The **debug hccp channel-switch** command displays debugging messages related to the SNMP messages and other communication between the CMTS and an RF-switch or channel-switch during N+1 (1:n) HCCP operations.



**Note**

You must use the **debug hccp events** command to activate HCCP event debugging before the **debug hccp channel-switch** command will generate any debug output.

**Examples** The following example shows typical output for the **debug hccp channel-switch** command:

```
Router# debug hccp events
Router# debug hccp channel-switch

HCCP channel action debugging is on

Mar 7 10:11:55:HCCP: snmp response error from 1.8.26.100.
Mar 7 10:12:16:HCCP: snmp response error from 1.8.26.100.
Mar 7 10:13:23:HCCP_SNMP: unknown Wavecom snmp type
Mar 7 10:12:21:HCCP: failed to make community
Mar 7 10:12:21:HCCP: failed to create snmp message
Mar 7 10:12:21:HCCP: SPrintVarBind() failed
```

■ **debug hccp channel-switch**

```
Mar 7 10:12:21:HCCP: snmp request failed
Mar 7 10:12:21:HCCP: snmp request cancelled
Mar 7 11:51:50:HCCP: group 1 member 1 Working is loading config
Mar 7 11:51:52:HCCP: group 1 member 1 Working finished loading config
```

| Related Commands | Command                          | Description                                                                                                   |
|------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------|
|                  | <b>debug hccp authentication</b> | Displays authentication debug messages for HCCP groups.                                                       |
|                  | <b>debug hccp events</b>         | Displays debug messages for all HCCP group interaction.                                                       |
|                  | <b>debug hccp inter-db</b>       | Displays debug messages for the inter-database events during HCCP operations.                                 |
|                  | <b>debug hccp plane</b>          | Displays debug messages for HCCP-related messages sent between the router's control plane and data backplane. |
|                  | <b>debug hccp sync</b>           | Displays debug messages for HCCP synchronization messages.                                                    |
|                  | <b>debug hccp timing</b>         | Displays debug messages for the timing of HCCP events.                                                        |

# debug hccp docsis-recovery

To display debug messages about the recovery of cable modems (CMs) during Hot Standby Connection-to-Connection Protocol (HCCP) N+1 (1:n) redundancy operations, use the **debug hccp docsis-recovery** command in privileged EXEC mode. To disable the debug message output, use the **no** form of this command.

**debug hccp docsis-recovery**

**no debug hccp docsis-recovery**

**Syntax Description** This command has no arguments or keywords.

**Command History** Debug is disabled and DOCSIS recovery messages are not displayed.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                             |
|-----------------|------------|----------------------------------------------------------|
|                 | 12.2(15)BC | This command was introduced.                             |
|                 | 12.3(21)BC | This command is obsolete on the Cisco uBR7246VXR router. |

**Usage Guidelines** The **debug hccp docsis-recovery** command displays debugging messages about the recovery of CMs during N+1 (1:n) HCCP operations.



**Note**

You must use the **debug hccp events** command to activate HCCP event debugging before the **debug hccp docsis-recovery** command will generate any debug output.

**Examples** The following example shows typical output for the **debug hccp docsis-recovery** command:

```
Router# debug hccp events
Router# debug hccp docsis-recovery

HCCP DOCSIS Recovery ACTION/EVENT messages debugging is on

HCCP 1 1 Working: Built 4 prio 3 CMs [tot 23]
```

| Related Commands | Command                          | Description                                             |
|------------------|----------------------------------|---------------------------------------------------------|
|                  | <b>debug hccp authentication</b> | Displays authentication debug messages for HCCP groups. |
|                  | <b>debug hccp events</b>         | Displays debug messages for all HCCP group interaction. |

| Command                    | Description                                                                                                   |
|----------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>debug hccp inter-db</b> | Displays debug messages for the inter-database events during HCCP operations.                                 |
| <b>debug hccp plane</b>    | Displays debug messages for HCCP-related messages sent between the router's control plane and data backplane. |
| <b>debug hccp sync</b>     | Displays debug messages for HCCP synchronization messages.                                                    |
| <b>debug hccp timing</b>   | Displays debug messages for the timing of HCCP events.                                                        |

# debug hccp events

To display debug messages for all Hot Standby Connection-to-Connection Protocol (HCCP) group interaction, use the **debug hccp events** command in privileged EXEC mode. To disable HCCP group debug message output, use the **no** form of this command.

**debug hccp events**

**no debug hccp events**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Debug is disabled and no HCCP group messages are displayed.

**Command Modes** Privileged Exec (#)

| Command History | Release                   | Modification                                                                    |
|-----------------|---------------------------|---------------------------------------------------------------------------------|
|                 | 12.1(3a)EC                | This command was introduced.                                                    |
|                 | 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router.   |
|                 | 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router. |
|                 | 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                        |

**Usage Guidelines** You must use the **debug hccp events** command to activate HCCP debugging before the other **debug hccp** commands will display debugging output.

**Examples** The following example shows HCCP group interaction debug message output produced when the **debug hccp events** command has been activated:

```
Router# debug hccp events
```

```
Sep 7 09:51:50.151:HCCP 1 0->1:HELLO Learn tran 31708
```

| Related Commands | Command                          | Description                                                                                                  |
|------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------|
|                  | <b>debug hccp authentication</b> | Displays authentication debug messages for HCCP groups.                                                      |
|                  | <b>debug hccp channel-switch</b> | Displays debug messages related to an RF or channel switch that is being used for HCCP N+1 (1:n) redundancy. |
|                  | <b>debug hccp inter-db</b>       | Displays debug messages for the inter-database events during HCCP operations.                                |

| Command                  | Description                                                                                                   |
|--------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>debug hccp plane</b>  | Displays debug messages for HCCP-related messages sent between the router's control plane and data backplane. |
| <b>debug hccp sync</b>   | Displays debug messages for HCCP synchronization messages.                                                    |
| <b>debug hccp timing</b> | Displays debug messages for the timing of HCCP events.                                                        |

# debug hccp fast-failure-detection

To display debug messages for fast failure detection (FFD) operations during Hot Standby Connection-to-Connection (HCCP) N+1 (1:n) redundancy, use the **debug hccp fast-failure-detection** command in privileged EXEC mode. To disable the debug message output, use the **no** form of this command.

**debug hccp fast-failure-detection**

**no debug hccp fast-failure-detection**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Debug is disabled and FFD messages are not displayed.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                             |
|-----------------|------------|----------------------------------------------------------|
|                 | 12.2(15)BC | This command was introduced.                             |
|                 | 12.3(21)BC | This command is obsolete on the Cisco uBR7246VXR router. |

**Usage Guidelines** The **debug hccp fast-failure-detection** command displays debugging messages about the operation of sync pulse messages for FFD support during N+1 (1:n) HCCP operations. A Working interface sends these sync pulse messages upon a failure to proactively inform the Protect interface that a switchover is occurring.



**Note**

You must use the **debug hccp events** command to activate HCCP event debugging before the **debug hccp fast-failure-detection** command will generate any debug output.

**Examples** The following example shows typical FFD debugging messages that are displayed by the **debug hccp fast-failure-detection** command:

```
Router# debug hccp events
Router# debug hccp fast-failure-detection
```

```
HCCP Fast Failure Detection ACTION/EVENT messages debugging is on
```

```
HCCP: FFD cutover packet address updated: src = 10.10.10.3, dst = 10.10.10.4
HCCP: FFD cutover packet allocated!
```

| Related Commands | Command                          | Description                                                                                                   |
|------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------|
|                  | <b>debug hccp authentication</b> | Displays authentication debug messages for HCCP groups.                                                       |
|                  | <b>debug hccp events</b>         | Displays debug messages for all HCCP group interaction.                                                       |
|                  | <b>debug hccp inter-db</b>       | Displays debug messages for the inter-database events during HCCP operations.                                 |
|                  | <b>debug hccp plane</b>          | Displays debug messages for HCCP-related messages sent between the router's control plane and data backplane. |
|                  | <b>debug hccp sync</b>           | Displays debug messages for HCCP synchronization messages.                                                    |
|                  | <b>debug hccp timing</b>         | Displays debug messages for the timing of HCCP events.                                                        |



# debug hccp inter-db

To display debug messages for the inter-database events during Hot Standby Connection-to-Connection Protocol (HCCP) operations, use the **debug hccp inter-db** command in privileged EXEC mode. To disable HCCP group debug message output, use the **no** form of this command.

**debug hccp inter-db {error | events}**

**no debug hccp inter-db {error | events}**

## Syntax Description

|               |                                                                                         |
|---------------|-----------------------------------------------------------------------------------------|
| <b>error</b>  | Display debugging messages related to database errors that occur.                       |
| <b>events</b> | Display debugging messages related to all events that occur during database operations. |

## Command Default

Debug is disabled and inter-database messages are not displayed.

## Command History

Privileged Exec (#)

## Command History

| Release                   | Modification                                                                    |
|---------------------------|---------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced.                                                    |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router.   |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router. |
| 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                        |

## Usage Guidelines

You must use the **debug hccp events** command before the **debug hccp inter-db** command will generate any debug message output.

## Examples

The following example shows typical debug output for the **debug hccp inter-db error** command:

```
Router# debug hccp events
```

```
Router# debug hccp inter-db error
```

```
HCCP inter database ERROR messages debugging is on
```

```
00:38:11: NULL itemplatep in cmts_build_us_srv_flow_loc.
```

```
00:38:11: NULL flowp in cmts_build_phs
```

```
00:38:11: NULL flowp in cmts_build_phs
```

```
00:38:11: Interface C5/0/0.3 does not exist. Resetting idb mapping for sid 3 to main interface
```

```
00:38:11: cmts_map_sid_idb(): failed to find swidb for 5.0.0.10 on Cable5/0/0
```

```
00:38:12: cmts_map_sid_idb(): failed to find swidb for 5.0.0.24 on Cable5/0/0
```

```
00:38:12: NULL parsed_datp in cmts_build_phs
```

```
00:38:12: NULL cminstp in cmts_build_classifier
```

**debug hccp inter-db**

```

00:38:12: NULL iflowp in cmts_build_classifier
00:38:12: NULL icfrp in cmts_build_classifier
00:38:12: NULL parsed_datp in cmts_build_classifier
00:38:12: NULL parsed_datp in cmts_build_us_srv_flow_loc
00:38:12: NULL itemplatep in cmts_build_us_srv_flow_loc.

```

The following example shows typical debug output for the **debug hccp inter-db events** command:

```

Router# debug hccp events
Router# debug hccp inter-db events

```

HCCP inter database EVENTS messages debugging is on

```

Jun 4 10:44:38.282: SRV TEMPLATE packet sanity check... ok.
Jun 4 10:44:38.282: Processing inter_srv_template.
Jun 4 10:44:38.282: Adding a new inter_srv_template
Jun 4 10:44:38.282: updating an existing inter_srv_template
Jun 4 10:44:38.286: UCD packet sanity check... ok.
Jun 4 10:44:38.286: Processing inter_ucd_instance
Jun 4 10:44:38.286: UCD packet sanity check... ok.
Jun 4 10:44:38.286: Processing inter_ucd_instance
Jun 4 10:44:38.286: CM packet sanity check... ok.
Jun 4 10:44:38.286: Processing inter_cm_instance.
Jun 4 10:44:38.286: Failed to find CM with mac address 0000.0cbd.cedf
Jun 4 10:44:38.286: The old inter_cm_instance is stale
Jun 4 10:44:38.286: Deleting an old inter_cm_instance
Jun 4 10:44:38.286: Adding a new inter_cm_instance
Jun 4 10:44:38.286: Adding a new inter_sid_instance
Jun 4 10:44:38.286: Updating an existing inter_cm_instance
Jun 4 10:44:38.286: SRV_FLOW packet sanity check... ok.
Jun 4 10:44:38.338: SID packet sanity check... ok.
Jun 4 10:44:38.338: Processing inter_sid_instance
Jun 4 10:44:38.338: Updating an existing inter_sid_instance
Jun 4 10:44:38.338: CM packet sanity check... ok.
Jun 4 10:53:42.907: Ranged list packet sanity check... ok.
Jun 4 10:53:42.907: Processing ranged_list.
Jun 4 10:53:42.907: Ranged list packet sanity check... ok.

```

**Related Commands**

| Command                          | Description                                                                                                   |
|----------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>debug hccp authentication</b> | Displays authentication debug messages for HCCP groups.                                                       |
| <b>debug hccp channel-switch</b> | Displays debug messages related to an RF or channel switch that is being used for HCCP N+1 (1:n) redundancy.  |
| <b>debug hccp events</b>         | Displays debug messages for all HCCP group interaction.                                                       |
| <b>debug hccp plane</b>          | Displays debug messages for HCCP-related messages sent between the router's control plane and data backplane. |
| <b>debug hccp sync</b>           | Displays debug messages for HCCP synchronization messages.                                                    |
| <b>debug hccp timing</b>         | Displays debug messages for the timing of HCCP events.                                                        |

# debug hccp plane

To display debug messages for Hot Standby Connection-to-Connection Protocol (HCCP)-related messages sent between the router's control plane and data backplane, use the **debug hccp plane** command in privileged EXEC mode. To disable HCCP group debug message output, use the **no** form of this command.

```
debug hccp plane {message | packet | syncpulse}
```

```
no debug hccp plane {message | packet | syncpulse}
```

## Syntax Description

|                  |                                                                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>message</b>   | Display debugging messages for the inter-plane messages that occur.                                                                             |
| <b>packet</b>    | Display a partial dump of packets that are sent between the control plane and data backplane.                                                   |
| <b>syncpulse</b> | Display debugging messages related to the “heartbeat” packets that are sent between the control plane and data backplane to synchronize events. |

## Command Default

Debug is disabled and HCCP control plane messages are not displayed.

## Command History

Privileged Exec (#)

## Command History

| Release                   | Modification                                                                                                                |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 12.2(4)BC1                | This command was introduced for the Cisco uBR10012 router.                                                                  |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router.                                               |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router. The <b>syncpulse</b> option also was added. |
| 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                                                                    |

## Usage Guidelines

The processor card and line cards on the Cisco uBR10012 router chassis communicate with each other using the control plane (which is on the processor card) and the data backplane (the backplane into which the line cards are installed). The **debug hccp plane** command displays debugging messages related to the messages and packets that are transmitted between the control plane and data backplane.



### Note

You must use the **debug hccp events** command to activate HCCP event debugging before the **debug hccp plane** command will generate any debug output.

## Examples

The following example shows typical output that is produced by the **debug hccp plane message** command:

```
Router# debug hccp events
```

**debug hccp plane**

```
Router# debug hccp plane message
```

HCCP inter-plane message debugging is on

```
Mar 7 08:47:26.513: HCCP 1 Working 4: Control plane sending message BECOME_ACTIVE_STRUCT
Mar 7 08:47:26.513: HCCP 1 Working Cable7/1/0: Control plane sending message FORWARDING
Mar 7 08:47:26.513: HCCP 1 Working 1: Control plane sending message STOP_SYNC
Mar 7 08:47:26.513: HCCP 1 Working 5: Control plane sending message STOP_SYNC
Mar 7 08:47:26.513: HCCP 2 Working 5: Control plane sending message BECOME_ACTIVE_STRUCT
Mar 7 08:47:26.513: HCCP 2 Working Cable7/0/1: Control plane sending message FORWARDING
Mar 7 08:47:26.513: HCCP 2 Working 4: Control plane sending message STOP_SYNC
Mar 7 08:47:26.513: HCCP 1 Protect 80: Data plane sending message FAILURE_SYNCPULSE
Mar 7 08:47:26.513: HCCP 4 Protect 81: Data plane sending message FAILURE_SYNCPULSE
Mar 7 08:47:26.513: HCCP 1 Protect 80: Data plane received message BECOME_ACTIVE_STRUCT
Mar 7 08:47:26.513: HCCP 2 Working 1: Control plane sending message STOP_SYNC
Mar 7 08:47:26.513: HCCP 1 Protect Cable8/1/0: Data plane received message FORWARDING
Mar 7 08:47:26.513: HCCP 1 Protect 1: Control plane sending message INIT_DS
Mar 7 08:47:26.513: HCCP 1 Protect 3: Control plane sending message INIT_DS
Mar 7 08:47:26.513: HCCP 2 Protect 5: Control plane sending message INIT_DS
Mar 7 08:47:26.513: HCCP 1 Protect Cable5/1/0: Control plane sending message READY
Mar 7 08:47:26.513: HCCP 1 Protect 1: Data plane received message START_SYNC
Mar 7 08:47:26.513: HCCP 1 Protect 1: Data plane received message DO_STATICSYNC
Mar 7 08:47:26.513: HCCP 1 Protect 1: Data plane sending message STATICDONE
Mar 7 08:47:26.513: HCCP 2 Protect 1: Data plane received message START_SYNC
Mar 7 08:47:26.513: HCCP 2 Protect 1: Data plane received message DO_STATICSYNC
Mar 7 08:47:26.513: HCCP 2 Protect 1: Data plane sending message STATICDONE
Mar 7 08:47:26.513: HCCP 2 Working 1: Control plane sending message BECOME_ACTIVE_STRUCT
Mar 7 08:47:26.513: HCCP 2 Working Cable5/0/1: Control plane sending message FORWARDING
Mar 7 08:47:26.513: HCCP 2 Protect 1: Control plane sending message STOP_SYNC
Mar 7 08:47:26.513: HCCP 2 Protect 1: Control plane sending message BECOME_STANDBY_STRUCT
Mar 7 08:47:26.513: HCCP 2 Protect Cable5/1/1: Control plane sending message BLOCKING
Mar 7 08:47:26.513: HCCP 2 Protect Cable5/1/1: Control plane sending message READY_NOT
Mar 7 08:47:26.513: HCCP 2 Protect 1: Control plane sending message DEACTIVATE_MEMBER
```

The following example shows a typical example of the message that is produced by the **debug hccp plane packet** command:

```
Router# debug hccp events
Router# debug hccp plane packet
```

HCCP inter-plane packet debugging is on

```
Aug 2 00:37:24.203: HCCP 1 70 Protect: Data plane receives DOCSIS sync packet
```

The following example shows a typical example of the message that is produced by the **debug hccp plane syncpulse** command:

```
Router# debug hccp events
Router# debug hccp plane syncpulse
```

HCCP inter-plane sync-pulse packet debugging is on

```
Aug 2 00:37:24.203: HCCP 1 70 Protect: Data plane receives DOCSIS sync packet
Aug 2 00:37:24.203: CMTS HCCP docsis_ver 1, sw_ver 1
```

**Tip**

Use both the **message** and **syncpulse** keyword options to debug heartbeat synchronization problems.

| Related Commands | Command                          | Description                                                                                                  |
|------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------|
|                  | <b>debug hccp authentication</b> | Displays authentication debug messages for HCCP groups.                                                      |
|                  | <b>debug hccp channel-switch</b> | Displays debug messages related to an RF or channel switch that is being used for HCCP N+1 (1:n) redundancy. |
|                  | <b>debug hccp events</b>         | Displays debug messages for all HCCP group interaction.                                                      |
|                  | <b>debug hccp inter-db</b>       | Displays debug messages for the inter-database events during HCCP operations.                                |
|                  | <b>debug hccp sync</b>           | Displays debug messages for HCCP synchronization messages.                                                   |
|                  | <b>debug hccp timing</b>         | Displays debug messages for the timing of HCCP events.                                                       |

# debug hccp rfswitch

To debug messages related to the Cisco NGRFSW-ADV, use the **debug hccp rfswitch** command in privileged EXEC mode. To stop debugging, use the **no** form of this command.

**debug hccp rfswitch** [hello]

**no debug hccp rfswitch** [hello]

|                    |       |                                                                            |
|--------------------|-------|----------------------------------------------------------------------------|
| Syntax Description | hello | Displays debug messages related to HELLO messages of the Cisco NGRFSW-ADV. |
|--------------------|-------|----------------------------------------------------------------------------|

|                 |      |
|-----------------|------|
| Command Default | None |
|-----------------|------|

|               |                     |
|---------------|---------------------|
| Command Modes | Privileged EXEC (#) |
|---------------|---------------------|

|                 |             |                              |
|-----------------|-------------|------------------------------|
| Command History | Release     | Modification                 |
|                 | 12.2(33)SCG | This command was introduced. |

|                  |                                                                                                                                                                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | To debug messages related to HELLO messages of the Cisco NGRFSW-ADV, use the <b>debug hccp rfswitch hello</b> command. To debug messages related to a Cisco NGRFSW-ADV event, message, and failure, use the <b>debug hccp rfswitch</b> command. |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Examples | <p>The following example shows how to debug the Cisco NGRFSW-ADV event, message, and failure.</p> <pre>Router# debug hccp rfswitch *Jun 26 22:43:56.434: RFSW: snd msg(size 8): 00 02 00 00 16 9B 6C 16 *Jun 26 22:43:57.058: RFSW: rcv msg (size 1291): 80 02 00 00 16 9B 41 EE 00 00 04 FF 00 D0 00 4B 01 01 00 03 02 03 00 0D 02 03 00 10 02 03 00 04 04 00 00 07 B8 05 0B 41 *Jun 26 22:43:59.374: RFSW: release watch boolean for type 0x02 when receive the reply *Jun 26 22:44:05.946: RFSW: snd msg(size 8): 00 0A 00 00 16 9F 6D DE *Jun 26 22:44:05.966: RFSW: rcv msg (size 64): 80 0A 00 00 16 9F 43 F3 00 00 00 34 00 00 19 02 00 02 61 73 76 33 2E 30 00 00 00 B8 8E 00 02 61 63 76 33 2E 30 00 00 00 *Jun 26 22:44:05.970: RFSW: release watch boolean for type 0x0A when receive the reply *Jun 26 22:44:18.006: RFSW: snd msg(size 8): 00 03 00 00 16 A4 A0 36 *Jun 26 22:44:18.050: RFSW: rcv msg (size 92): 80 03 00 00 16 A4 2D 3A 00 00 00 50 40 6A 40 6A 40 6A 40 6A 40 6A 09 4F 09 4F 09 4F 09 4F 09 4F 09 38 09 38 09 38 09 38 *Jun 26 22:44:18.050: RFSW: release watch boolean for type 0x03 when receive the reply</pre> |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The following example shows how to debug messages related to the HELLO messages of the Cisco NGRFSW-ADV.

```
Router# debug hccp rfswitch hello
*Jun 26 22:41:45.678: RFSW: snd msg(size 8): 00 01 00 00 16 6F 9E 64
*Jun 26 22:41:45.694: RFSW: rcv msg (size 54): 80 01 00 00 16 6F DE 38 00 00 00 2A 01 28
80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80
*Jun 26 22:41:45.694: RFSW: process HELLO message with seq 0x166F, Group: 1F
*Jun 26 22:41:48.678: RFSW: snd msg(size 8): 00 01 00 00 16 70 58 55
*Jun 26 22:41:48.694: RFSW: rcv msg (size 54): 80 01 00 00 16 70 A6 47 00 00 00 2A 01 28
80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80
*Jun 26 22:41:48.694: RFSW: process HELLO message with seq 0x1670, Group: 1F
```

**Associated Features** The `debug hccp rfswitch` command is used to debug the Cisco uBR Advanced RF Switch (NGRFSW-ADV). See [Cisco uBR Advanced RF Switch Software Configuration Guide](#).

| Related Commands | Command                  | Description                                   |
|------------------|--------------------------|-----------------------------------------------|
|                  | rf-switch auxport enable | Enables the AUX port on the Cisco NGRFSW-ADV. |

# debug hccp sync

To display debugging messages for Hot Standby Connection-to-Connection Protocol (HCCP) SYNC activity, use the **debug hccp sync** command in privileged EXEC mode. To disable the debug message output, use the **no** form of the command.

## debug hccp sync

**debug hccp sync cable** [**bpi** | **classifier** | **clear-cm** | **cm** | **qos-profile** | **cpe-management** | **host** | **offered-band** | **phs** | **qosparam** | **ranged-list** | **service-flow** | **sid** | **tlvs** | **ucd**]

## no debug hccp sync

**no debug hccp sync cable** [**bpi** | **classifier** | **clear-cm** | **cm** | **qos-profile** | **cpe-management** | **host** | **offered-band** | **phs** | **qosparam** | **ranged-list** | **service-flow** | **sid** | **tlvs** | **ucd**]

| Syntax Description    |            |                                                                                                                                                        |
|-----------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cable</b>          | (Optional) | Displays debugging for SYNC messages on the cable interface.                                                                                           |
| <b>bpi</b>            | (Optional) | Displays debugging for SYNC messages about BPI configuration and operation.                                                                            |
| <b>classifier</b>     | (Optional) | Displays debugging for SYNC messages about classifier coordination.                                                                                    |
| <b>clear-cm</b>       | (Optional) | Displays debugging for CLEAR-CM messages that are sent between interfaces to sync the CM databases when the <b>clear cable modem</b> command is given. |
| <b>cm</b>             | (Optional) | Displays debugging for CM-related SYNC messages.                                                                                                       |
| <b>qos-profile</b>    | (Optional) | Displays debugging for SYNC messages related to quality of service (QoS) profile messages generated by the CM.                                         |
| <b>cpe-management</b> | (Optional) | Displays debugging for SYNC messages that concern CPE-related parameters, such as MAX CPE, MAX CPE IP, and max learnable addresses.                    |
| <b>host</b>           | (Optional) | Displays debugging for host-related SYNC messages.                                                                                                     |
| <b>offered-band</b>   | (Optional) | Displays debugging messages for CMTS-generated offered band messages.                                                                                  |
| <b>phs</b>            | (Optional) | Displays debugging for SYNC messages about PHS values.                                                                                                 |
| <b>qosparam</b>       | (Optional) | Displays debugging for SYNC messages about QoS and service templates.                                                                                  |
| <b>ranged-list</b>    | (Optional) | Displays debugging for SYNC messages about ranged list messages.                                                                                       |
| <b>service-flow</b>   | (Optional) | Displays debugging for SYNC messages about service flows.                                                                                              |
| <b>sid</b>            | (Optional) | Displays debugging for SYNC messages that concern service IDs (SIDs).                                                                                  |
| <b>tlvs</b>           | (Optional) | Displays any type, length, or value errors in SYNC messages.                                                                                           |
| <b>ucd</b>            | (Optional) | Displays debugging for SYNC messages that concern DOCSIS upstream channel descriptor (UCD) messages.                                                   |

**Command Default** Debug is disabled and messages for HCCP sync activity are not displayed.



## Command History

| Release                   | Modification                                                                                                                                                                                                                     |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3a)EC                | This command was introduced.                                                                                                                                                                                                     |
| 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router. Also, the <b>cable</b> message-specific options were added to allow the debugging of a particular set of messages without overloading the console. |
| 12.2(8)BC1                | The <b>offered-band</b> option was added to add in debugging problems with blind-hopping.                                                                                                                                        |
| 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router.                                                                                                                                                  |
| 12.2(15)BC2               | The <b>cpe-management</b> option was added.                                                                                                                                                                                      |
| 12.3BC                    | The <b>clear-cm</b> and <b>cm-qos-profile</b> options were added.                                                                                                                                                                |

## Usage Guidelines

You must activate the **debug hccp events** command before the **debug hccp sync** command will generate any debug message output.

## Examples

The following example shows typical output for the **debug hccp sync** command:

```
Router# debug hccp events
Router# debug hccp sync
```

```
Sep 7 09:57:25.215:HCCP 1 0<-1:SYNC Teach tran 88 type DOCSIS10, tran_sync 82
Sep 7 09:57:25.215:HCCP 1 0->1:SYNC_ACK Learn tran 88
Sep 7 09:57:25.219:DOCSIS10_QOS:qos 1
```

The following example shows typical debugging messages for the **debug hccp sync cable offered-band** command:

```
Router# debug hccp events
Router# debug hccp sync cable offered-band
```

```
CMTS OFFERED BAND sync messages debugging is on

Apr 24 17:17:03.935: HCCP: send offered_band data for US 0
 freq 12400000 chnnl-width 1600000 ip-pwr-lvl 0,
 spec-grp 12, modulation 1, awacs NO,
 shared spectrum NO
Apr 24 17:17:03.935: assign from non-shared spectrum group
Apr 24 17:17:03.935: cmts_freqhop_upd(0x60D5FDB0, 1, 12400000, 0)
Apr 24 17:17:04.067: HCCP of offered band
 HCCP: get offered_band data for US 0
 freq 12400000 chnnl-width 1600000 ip-pwr-lvl 0,
 spec-grp 12, modulation 1, awacs NO,
 shared spectrum NO
Apr 24 17:17:16.467: HCCP: send offered_band data for US 0
 freq 12400000 chnnl-width 1600000 ip-pwr-lvl 0,
 spec-grp 12, modulation 1, awacs NO,
 shared spectrum NO
Apr 24 17:17:16.467: HCCP: send offered_band data for US 1
 freq 10800000 chnnl-width 1600000 ip-pwr-lvl 0,
 spec-grp 12, modulation 1, awacs NO,
 shared spectrum NO
Apr 24 17:17:16.467: HCCP: send offered_band data for US 2
 freq 11600000 chnnl-width 3200000 ip-pwr-lvl 0,
 spec-grp 12, modulation 1, awacs NO,
 shared spectrum NO
```

## ■ debug hccp sync

```

Apr 24 17:17:16.467: HCCP: send offered_band data for US 3
 freq 11600000 chnnl-width 3200000 ip-pwr-lvl 0,
 spec-grp 12, modulation 2, awacs NO,
 shared spectrum NO
Apr 24 17:17:16.467: HCCP of offered band
 HCCP: get offered_band data for US 0
 freq 12400000 chnnl-width 1600000 ip-pwr-lvl 0,
 spec-grp 12, modulation 1, awacs NO,
 shared spectrum NO

```

**Related Commands**

| Command                          | Description                                                                                                                                                               |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>debug hccp authentication</b> | Displays authentication debug messages for HCCP groups.                                                                                                                   |
| <b>debug hccp channel-switch</b> | Displays debug messages related to an RF or channel switch that is being used for HCCP N+1 (1:n) redundancy.                                                              |
| <b>debug hccp events</b>         | Displays debug messages for all HCCP group interaction.                                                                                                                   |
| <b>debug hccp inter-db</b>       | Displays debug messages for the inter-database events during HCCP operations.                                                                                             |
| <b>debug hccp plane</b>          | Displays debug messages for HCCP-related messages sent between the router's control plane and data backplane.                                                             |
| <b>debug hccp timing</b>         | Displays debug messages for the timing of HCCP events.                                                                                                                    |
| <b>debug packetcable hccp</b>    | Enables debugging messages for events that are related to Hot Standby Connection-to-Connection Protocol (HCCP) N+1 redundancy synchronization for PacketCable operations. |

# debug hccp timing

To display debug messages for the timing of Hot Standby Connection-to-Connection Protocol (HCCP) events, use the **debug hccp timing** command in privileged EXEC mode. To disable the debug message output, use the **no** form of this command.

**debug hccp timing [if-config]**

**no debug hccp timing [if-config]**

|                           |                                                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>if-config</b> (Optional) Displays debugging messages showing the timing of the reconfiguration of cable interfaces during HCCP redundancy operations. |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|

|                        |                                                                                 |
|------------------------|---------------------------------------------------------------------------------|
| <b>Command Default</b> | Debug is disabled and messages for the timing of HCCP events are not displayed. |
|------------------------|---------------------------------------------------------------------------------|

|                      |                     |
|----------------------|---------------------|
| <b>Command Modes</b> | Privileged EXEC (#) |
|----------------------|---------------------|

| Command History | Release                   | Modification                                                                    |
|-----------------|---------------------------|---------------------------------------------------------------------------------|
|                 | 12.1(3a)EC                | This command was introduced.                                                    |
|                 | 12.2(4)XF1,<br>12.2(4)BC1 | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR10012 router.   |
|                 | 12.2(11)BC1               | Support was added for the N+1 (1:n) RF Switch with the Cisco uBR7246VXR router. |
|                 | 12.2(15)BC1               | The <b>if-config</b> option was added.                                          |
|                 | 12.3(21)BC                | This command is obsolete on the Cisco uBR7246VXR router.                        |

|                         |                                                                                                                                            |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | You must activate the <b>debug hccp events</b> command before the <b>debug hccp timing</b> command will generate any debug message output. |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                      |
|-----------------|--------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows typical output for the <b>debug hccp timing</b> command: |
|-----------------|--------------------------------------------------------------------------------------|

```
Router# debug hccp events
Router# debug hccp timing
```

HCCP timing measurement debugging is on

```
May 31 10:21:07.609 HCCP P is busy. Deactivating 1 6
May 31 10:21:07.609 HCCP P is busy. Deactivating 2 6
May 31 10:21:08.705 HCCP hwif_goingdown for Cable8/1/0. Deactivate 1 6
May 31 10:21:08.705 HCCP hwif_goingdown for Cable8/1/1. Deactivate 2 6
May 31 10:21:08.773 HCCP 2 6 Working: become standby - 68 msec
May 31 10:21:08.793 HCCP 1 6 Working: become standby - 20 msec
May 31 10:21:10.730 HCCP 1 1 Working: turn on "uc" - 8 msec
May 31 10:21:10.730 HCCP 1 1 Working: turn on "nru" - 0 msec
May 31 10:21:10.734 HCCP 1 1 Working: become active - 4 msec
```

```

May 31 10:21:10.774 HCCP 2 1 Working: turn on "uc" - 52 msec
May 31 10:21:10.774 HCCP 2 1 Working: turn on "nru" - 0 msec
May 31 10:21:10.774 HCCP 2 1 Working: become active - 0 msec
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/0. Deactivate 1 1
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/0. Deactivate 1 6
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/0. Deactivate 1 3
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/0. Deactivate 1 2
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/0. Deactivate 1 5
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/0. Deactivate 1 4
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/1. Deactivate 2 1
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/1. Deactivate 2 3
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/1. Deactivate 2 6
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/1. Deactivate 2 2
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/1. Deactivate 2 4
May 31 10:21:12.350 HCCP hwif_goingdown for Cable5/1/1. Deactivate 2 5
May 31 10:21:13.726 HCCP 1 1 Protect: turn off "uc" - 1972 msec
May 31 10:21:13.790 HCCP 2 1 Protect: turn off "uc" - 2036 msec
May 31 10:21:14.422 HCCP 1 1 Protect: turn off "nru" - 696 msec
May 31 10:21:14.422 HCCP 1 1 Protect: unload config (if) - 0 msec
May 31 10:21:14.438 HCCP 1 1 Protect: unload config (subif) - 16 msec
May 31 10:21:14.702 HCCP 1 1 Protect: unload config (ds) - 264 msec
May 31 10:21:14.702 HCCP 1 1 Protect: become standby - 0 msec
May 31 10:21:16.078 HCCP 2 1 Protect: turn off "nru" - 2288 msec
May 31 10:21:16.078 HCCP 2 1 Protect: unload config (if) - 0 msec
May 31 10:21:16.078 HCCP 2 1 Protect: unload config (subif) - 0 msec
May 31 10:21:16.599 HCCP 2 1 Protect: unload config (ds) - 520 msec
May 31 10:21:16.599 HCCP 2 1 Protect: become standby - 0 msec
May 31 10:21:17.014 HCCP: P missed hello ack in LEARN state and is locked. Deactivate 4 1
May 31 10:21:17.014 HCCP 4 1 Protect: turn off "rfswitch" - 52 msec
May 31 10:21:17.593 HCCP 3 1 Working: turn on "rfswitch" - 0 msec
May 31 10:21:17.593 HCCP 3 1 Working: become active - 0 msec
May 31 10:21:18.112 HCCP 1 1 Protect: load config (if) - 0 msec
May 31 10:21:18.112 HCCP 1 1 Protect: load config (subif) - 4 msec
May 31 10:21:18.331 HCCP 1 1 Protect: load config (ds) - 100 msec
May 31 10:21:18.331 HCCP 2 1 Working: turn off "rfswitch" - 0 msec
May 31 10:21:18.331 HCCP 2 Cable5/0/1 Protect: resolve conflict Learn->Teach
May 31 10:21:18.331 HCCP 2 1 Protect: load config (if) - 0 msec
May 31 10:21:18.331 HCCP 2 1 Protect: load config (subif) - 0 msec
May 31 10:21:19.691 HCCP 2 1 Protect: load config (ds) - 76 msec
May 31 10:21:20.112 HCCP 2 1 Protect: turn on "rfswitch" - 48 msec
May 31 10:21:20.112 HCCP 2 1 Protect: become active - 0 msec
May 31 10:21:20.112 HCCP 2 1 Protect: load config (ds) - 76 msec
May 31 10:21:20.112 HCCP 2 1 Protect: turn on "rfswitch" - 48 msec
May 31 10:21:20.112 HCCP 2 1 Protect: become active - 0 msec

```

The following example shows typical output for the **debug hccp timing if-config** command:

```

Router# debug hccp events
Router# debug hccp timing if-config

```

HCCP Timing measurements messages of (UN)LOAD IF config CLI is on

```

HCCP 1 1 Working: unload config (ds) - 112 msec
HCCP 1 1 Protect: load config (ds) - 123 msec
HCCP 1 1 Protect: load config (chnl set freq) - 35 msec

```

| Related Commands | Command                          | Description                                                                                                   |
|------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------|
|                  | <b>debug hccp authentication</b> | Displays authentication debug messages for HCCP groups.                                                       |
|                  | <b>debug hccp channel-switch</b> | Displays debug messages related to an RF or channel switch that is being used for HCCP N+1 (1:n) redundancy.  |
|                  | <b>debug hccp events</b>         | Displays debug messages for all HCCP group interaction.                                                       |
|                  | <b>debug hccp inter-db</b>       | Displays debug messages for the inter-database events during HCCP operations.                                 |
|                  | <b>debug hccp plane</b>          | Displays debug messages for HCCP-related messages sent between the router's control plane and data backplane. |
|                  | <b>debug hccp sync</b>           | Displays debug messages for HCCP synchronization messages.                                                    |

# debug hw-module all upgrade

To enable debug messages for field-programmable devices (FPDs), use the **debug hw-module all upgrade** command in privileged EXEC configuration mode. To disable debug messages, use the **no** form of the command.

```
debug hw-module all upgrade [error | event]

no debug hw-module all upgrade [error | event]
```

|                    |              |                                                                 |
|--------------------|--------------|-----------------------------------------------------------------|
| Syntax Description | <b>all</b>   | Enable debug messaging for all supported modules in the system. |
|                    | <b>error</b> | (Optional) Enables display of FPD upgrade error messages.       |
|                    | <b>event</b> | (Optional) Enables display of FPD upgrade event messages.       |

Defaults    No default behavior or values

Command Modes    Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(18)SXE | This command was introduced.                                                                                                                                                   |
|                 | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                |
|                 | 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB. The FPD image upgrade is supported only for the SPAs inserted in the Cisco SIP-600 on a Cisco uBR10012 router. |

Usage Guidelines    The **debug hw-module all upgrade** command is intended for use by Cisco Systems technical support personnel.

If you attempt to use this command without a SPA installed, or with an incompatible SPA installed, the keyword options are not provided.



**Caution**

Because debugging output is assigned high priority in the CPU process, it can render the system unusable. For this reason, use **debug** commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco Systems technical support personnel. Moreover, it is best to use **debug** commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased **debug** command processing overhead will affect system use.

For more information about FPD upgrades on SPA interface processors (SIPs) and shared port adapters (SPAs), refer to the *Cisco 7600 Series Router SIP, SSC, and SPA Software Configuration Guide*.

---

**Examples**

The following example enables FPD upgrade debug messages for all supported card types on the Cisco 7600 series router:

```
Router# debug hw-module all upgrade
```

# debug hw-module bay

To enable debugging information for a SPA, use the **debug hw-module bay** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

## Cisco IOS Releases 12.3(23)BC and 12.2(33)SCA

```
debug hw-module bay slot/subslot/bay {commands | errors | events | interrupts | oir | periodic}

no debug hw-module bay slot/subslot/bay {commands | errors | events | interrupts | oir |
periodic}
```

## Cisco IOS Release 12.2(33)SCB

```
debug hw-module bay slot/bay/port {commands | errors | events | interrupts | oir | periodic}

no debug hw-module bay slot/bay/port {commands | errors | events | interrupts | oir | periodic}
```

| Syntax            | Description                                                                                              |
|-------------------|----------------------------------------------------------------------------------------------------------|
| <i>slot</i>       | The slot where a SIP resides. On the Cisco uBR10012 router, slots 1 and 3 can be used for a SIP.         |
| <i>subslot</i>    | The subslot where the Wideband SIP resides. On the Cisco uBR10012 router, subslot 0 is always specified. |
| <i>bay</i>        | The bay in the SIP where a SPA is located. Valid values are 0 (upper bay) and 1 (lower bay).             |
| <i>port</i>       | Specifies the interface number on the SPA.                                                               |
| <b>commands</b>   | Enables debug messages for control plane configuration and commands on a SPA.                            |
| <b>errors</b>     | Enables debug messages for error handling and race conditions on a SPA.                                  |
| <b>events</b>     | Enables debug messages for control plane event notifications on a SPA.                                   |
| <b>interrupts</b> | Enables debug messages for interrupt handling on a SPA.                                                  |
| <b>oir</b>        | Enables debug messages for online insertion and removal (OIR) processing on a SPA.                       |
| <b>periodic</b>   | Enables debug messages for periodic processing on a SPA.                                                 |

**Command Default** No Wideband SPA debug messages are enabled.

**Command Modes** Privileged EXEC (#)



**Command History**

| Release     | Modification                                                                                                               |
|-------------|----------------------------------------------------------------------------------------------------------------------------|
| 12.3(21)BC  | This command was introduced for the Cisco uBR10012 router.                                                                 |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA.                                                            |
| 12.2(33)SCB | This command was modified to change the addressing format for a SPA from <i>slot/subslot/bay</i> to <i>slot/bay/port</i> . |

**Usage Guidelines**

The **debug hw-module bay** command is intended for use by Cisco technical support personnel.

**Caution**

Because debugging output is assigned high priority in the CPU process, it can render the system unusable. For this reason, use **debug** commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support personnel. Moreover, it is best to use **debug** commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased **debug** command processing overhead will affect system use.

If you attempt to use a **debug hw-module bay** command without a SPA installed, the keyword options are not provided.

**Examples**

The following example shows how to enable debug messages for error handling and race conditions:

```
Router# debug hw-module bay 1/0/0 errors
```

**Related Commands**

| Command                   | Description                                          |
|---------------------------|------------------------------------------------------|
| <b>debug c10k-jacket</b>  | Enables debugging information for the Wideband SIP.  |
| <b>debug cable fn</b>     | Enables debugging information for cable fiber nodes. |
| <b>debug cable wbcmts</b> | Enables debugging information for the wideband CMTS. |

# debug nls

To debug the NLS request, use the **debug nls** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

- debug nls verbose**
- no debug nls verbose**

|                    |                                                                    |
|--------------------|--------------------------------------------------------------------|
| Syntax Description | <b>verbose</b> (Optional) Displays detailed debugging information. |
|--------------------|--------------------------------------------------------------------|

|                 |                                                       |
|-----------------|-------------------------------------------------------|
| Command Default | Debug is disabled and NLS messages are not displayed. |
|-----------------|-------------------------------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |                |                              |
|-----------------|----------------|------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>          |
|                 | 12.3(21a)BC3   | This command was introduced. |

|          |                                                                                                    |
|----------|----------------------------------------------------------------------------------------------------|
| Examples | The following example shows enabling the <b>debug nls</b> command:<br><br>Router# <b>debug nls</b> |
|----------|----------------------------------------------------------------------------------------------------|

|                  |                |                                                       |
|------------------|----------------|-------------------------------------------------------|
| Related Commands | <b>Command</b> | <b>Description</b>                                    |
|                  | <b>nls</b>     | Enables Network Layer signalling (NLS) functionality. |

# debug packetcable all

To display debugging messages for all PacketCable events, use the **debug packetcable all** command in privileged EXEC mode. To turn off Packetcable debugging, use the **no** form of this command.

**debug packetcable all [detail]**

**no debug packetcable all [detail]**

|                    |                                                                                                                                                        |                                                                                                                  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Syntax Description | <b>detail</b>                                                                                                                                          | Displays additional debug messages for specific events, such as the content of PacketCable headers and messages. |
|                    | <b>Note</b> Release 12.2(15)BC1 removed this option and replaced it with the <b>verbose</b> option of the <b>debug packetcable subscriber</b> command. |                                                                                                                  |

|               |                 |
|---------------|-----------------|
| Command Modes | Privileged EXEC |
|---------------|-----------------|

|                 |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command History | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                 | 12.2(8)BC2     | This command was introduced for the Cisco uBR7200 series universal broadband router.                                                                                                                                                                                                                                                                                                                                                                                      |
|                 | 12.2(15)BC1    | Support was added for the Cisco uBR10012 universal broadband router.<br><br>Also, the <b>detail</b> option was removed, and this command now requires that you enable PacketCable debugging for one or more IP addresses, using the <b>debug packetcable subscriber</b> command, before displaying any output.<br><br>In addition, <b>packetcable gate coordination</b> support was removed for all platforms because that debugging option was removed from the release. |

|                  |                                                                                                                                                                                                                                                                                        |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usage Guidelines | This command enables the display of all PacketCable debugging messages, and is equivalent to giving the other <b>debug packetcable gate</b> commands individually. Use this command to get complete debugging about a particular event, such as the creation or termination of a call. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

In Cisco IOS Release 12.2(15)BC1 and later releases, you must first use the **debug packetcable subscriber** command to enable PacketCable debugging for one or more IP addresses before the **debug packetcable all** command displays any output.



## Note

To display detailed debugging output in Cisco IOS Release 12.2(15)BC1 and later releases, use the **verbose** option when you enable PacketCable debugging output using the **debug packetcable subscriber** command.



## Caution

This command can generate a significant amount of debugging information, and the volume of this information could impact system performance on active PacketCable networks. Do not use this command except in lab or test networks, or where the need to troubleshoot problems makes the impact on system performance acceptable.

**Examples**

The following example shows typical output for the **debug packetcable all** command for the events starting with a call is placed up until the gates go into the committed state:

```
Router# debug packetcable all
PacketCable Client:
 Pktcbl gate control msgs debugging is on
 Pktcbl gate coord msgs debugging is on
 Pktcbl commit msgs debugging is on
 Pktcbl event msgs debugging is on
 Pktcbl rsvp-to-docsis msgs debugging is on
 Pktcbl gate database changes debugging is on

Router#

Jul 25 14:28:13.442 UTC: PktCbl(cops): Received a COPS DEC message, flags is 0x1
Jul 25 14:28:13.442 UTC: Pktcbl(gcp): Received GATE ALLOC message, tid=0x4
Jul 25 14:28:13.442 UTC: Pktcbl(gdb): Created new Subscriber IE for 3.3.1.3
Jul 25 14:28:13.442 UTC: Pktcbl(gdb): Updated subscriber IE [subs addr: 3.3.1.3, gate: 38]
Jul 25 14:28:13.442 UTC: Pktcbl(gdb): Created gate IE, gateid = 38, total gates: 1
Jul 25 14:28:13.442 UTC: Pktcbl(gdb): Started gate [id 38] timer t0 [30 sec]
Jul 25 14:28:13.442 UTC: Pktcbl(gcp): Building GCP message, added obj TRANSACTION ID ; len:8 padding:0
Jul 25 14:28:13.442 UTC: Pktcbl(gcp): Building GCP message, added obj SUBSCRIBER ID (IPV4); len:8 padding:0
Jul 25 14:28:13.442 UTC: Pktcbl(gcp): Building GCP message, added obj GATE ID ; len:8 padding:0
Jul 25 14:28:13.442 UTC: Pktcbl(gcp): Building GCP message, added obj ACTIVITY COUNT ; len:8 padding:0
Jul 25 14:28:13.442 UTC: Pktcbl(gcp): Building GCP message, added obj GCOORD PORT ; len:8 padding:0
Jul 25 14:28:13.442 UTC: Pktcbl(gcp): Built GCP message, GATE ALLOC ACK , length: 40, copsLen 68
Jul 25 14:28:13.658 UTC: PktCbl(cops): Received a COPS DEC message, flags is 0x1
Jul 25 14:28:13.658 UTC: Pktcbl(gcp): Received GATE SET message, tid=0x6
Jul 25 14:28:13.658 UTC: Pktcbl(gdb): request to transition gate ID 38 to state 2
Jul 25 14:28:13.658 UTC: Pktcbl(gdb): GateID: 38, changed state to: 2
Jul 25 14:28:13.658 UTC: Pktcbl(gdb): request to transition gate ID 38 to state 2
Jul 25 14:28:13.658 UTC: Pktcbl(gdb): Stopped gate [id 38] timer [type 1]
Jul 25 14:28:13.658 UTC: Pktcbl(gdb): Started gate [id 38] timer t1 [180000 msec]
Jul 25 14:28:13.658 UTC: Pktcbl(gcp): Building GCP message, added obj TRANSACTION ID ; len:8 padding:0
Jul 25 14:28:13.658 UTC: Pktcbl(gcp): Building GCP message, added obj SUBSCRIBER ID (IPV4); len:8 padding:0
Jul 25 14:28:13.658 UTC: Pktcbl(gcp): Building GCP message, added obj GATE ID ; len:8 padding:0
Jul 25 14:28:13.658 UTC: Pktcbl(gcp): Building GCP message, added obj ACTIVITY COUNT ; len:8 padding:0
Jul 25 14:28:13.658 UTC: Pktcbl(gcp): Built GCP message, GATE SET ACK , length: 32, copsLen 60
Jul 25 14:28:13.822 UTC: PktCbl(d2r): DSA-REQ received, gateid: 38
Jul 25 14:28:13.822 UTC: Pktcbl(gdb): handle=38 dir=0 type=3 (get gate flowspec)
Jul 25 14:28:13.822 UTC: Pktcbl(gdb): handle=38 dir=1 type=2 (get gate flowspec)
Jul 25 14:28:13.822 UTC: Pktcbl(gdb): handle=38 dir=0 type=2 (get gate flowspec)
Jul 25 14:28:13.822 UTC: Pktcbl(gdb): handle=38 dir=1 type=3 spec=61DA13A8 (set gate flowspec)
Jul 25 14:28:13.822 UTC: Pktcbl(gdb): handle=38 dir=0 type=3 spec=61DA13C4 (set gate flowspec)
Jul 25 14:28:13.822 UTC: Pktcbl(gdb): request to transition gate ID 38 to state 3
Jul 25 14:28:13.822 UTC: Pktcbl(gdb): GateID: 38, changed state to: 3
Jul 25 14:28:13.826 UTC: Pktcbl(em): Send msg: type=QOS_RESERVE dqos=0x628DE278
Jul 25 14:28:13.834 UTC: Pktcbl(gdb): Get gate spec info, handle=38 dir=0 spec=61DA1420
Jul 25 14:28:23.950 UTC: Pktcbl(g2g): received GATE_OPEN message, tid 2
Jul 25 14:28:23.950 UTC: Pktcbl(g2g): sending g2g GATE_OPEN_ACK message to 192.168.80.15:1812 from
192.168.80.1:50048
Jul 25 14:28:23.950 UTC: Pktcbl(gdb): request to transition gate ID 38 to state 5
Jul 25 14:28:23.950 UTC: Pktcbl(gdb): GateID: 38, changed state to: 5
Jul 25 14:28:23.950 UTC: Pktcbl(gdb): Started gate [id 38] timert2 [2000 ms]
Jul 25 14:28:24.030 UTC: Pktcbl(gdb): Get gate spec info, handle=38 dir=1 spec=61DA1268
Jul 25 14:28:24.034 UTC: PktCbl(d2r): DSC-REQ received, gateid: 38
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): Get gate spec info, handle=38 dir=0 spec=61DA1308
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): handle=38 dir=0 type=6 (get gate flowspec)
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): handle=38 dir=1 type=3 (get gate flowspec)
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): handle=38 dir=0 type=3 (get gate flowspec)
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): handle=38 dir=1 type=6 spec=61DA13A8 (set gate flowspec)
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): handle=38 dir=0 type=6 spec=61DA13C4 (set gate flowspec)
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): request to transition gate ID 38 to state 4
```

```

Jul 25 14:28:24.034 UTC: Pktcbl(gdb): GateID: 38, changed state to: 6
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): request to transition gate ID 38 to state 4
Jul 25 14:28:24.034 UTC: PktCbl(Commit): state: id=38
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): request to transition gate ID 38 to state 6
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): Cancelled gate [id 38] timer t2
Jul 25 14:28:24.034 UTC: Pktcbl(gdb): Cancelled gate [id 38] timer t1
Jul 25 14:28:24.034 UTC: Pktcbl(em): Send msg: type=QOS_COMMIT dqos=0x628DE278
Jul 25 14:28:24.466 UTC: Pktcbl(g2g): received GATE_OPEN message, tid 2
Jul 25 14:28:24.466 UTC: Pktcbl(g2g): Duplicate GATE-OPEN for gateID: 38, not processing it, sending
GATE-OPEN-ACK
Jul 25 14:28:24.466 UTC: Pktcbl(g2g): sending g2g GATE_OPEN_ACK message to 192.168.80.15:1812 from
192.168.80.1:50048
Jul 25 14:28:25.998 UTC: Pktcbl(g2g): received GATE_OPEN message, tid 2
Jul 25 14:28:25.998 UTC: Pktcbl(g2g): Duplicate GATE-OPEN for gateID: 38, not processing it, sending
GATE-OPEN-ACK
Jul 25 14:28:25.998 UTC: Pktcbl(g2g): sending g2g GATE_OPEN_ACK message to 192.168.80.15:1812 from
192.168.80.1:50048
Jul 25 14:28:55.446 UTC: PktCbl(d2r): DSD-REQ received, gateid: 38
Jul 25 14:28:55.446 UTC: Pktcbl(gdb): Gate delete requested, gateid = 38
Jul 25 14:28:55.446 UTC: Pktcbl(gdb): request to transition gate ID 38 to state 7
Jul 25 14:28:55.450 UTC: Pktcbl(gdb): GateID: 38, changed state to: 7
Jul 25 14:28:55.450 UTC: Pktcbl(em): Send msg: type=QOS_RELEASE dqos=0x628DE278
Jul 25 14:28:55.450 UTC: Pktcbl(gdb): Started gate [id 38] timer t5 [500 msec]
Jul 25 14:28:55.450 UTC: Pktcbl(g2g): sending g2g GATE_CLOSE message to 172.22.79.22:1812 from
172.22.79.44:50048
Jul 25 14:28:55.950 UTC: Pktcbl: Timer event
Jul 25 14:28:55.950 UTC: Pktcbl(g2g): Timer T5 expired, gateID: 38
Jul 25 14:28:55.950 UTC: Pktcbl(gdb): Started gate [id 38] timer t5 [500 msec]
Jul 25 14:28:55.950 UTC: Pktcbl(g2g): Retransmitting message: GATE_CLOSE, gateID: 38
Jul 25 14:28:56.450 UTC: Pktcbl: Timer event
Jul 25 14:28:56.450 UTC: Pktcbl(g2g): Timer T5 expired, gateID: 38
Jul 25 14:28:56.450 UTC: Pktcbl(gdb): Started gate [id 38] timer t5 [500 msec]
Jul 25 14:28:56.450 UTC: Pktcbl(g2g): Retransmitting message: GATE_CLOSE, gateID: 38
Jul 25 14:28:56.950 UTC: Pktcbl: Timer event
Jul 25 14:28:56.950 UTC: Pktcbl(g2g): Timer T5 expired, gateID: 38
Jul 25 14:28:56.950 UTC: Pktcbl(gdb): Started gate [id 38] timer t5 [500 msec]
Jul 25 14:28:56.950 UTC: Pktcbl(g2g): Retransmitting message: GATE_CLOSE, gateID: 38
Jul 25 14:28:57.450 UTC: Pktcbl: Timer event
Jul 25 14:28:57.450 UTC: Pktcbl(g2g): Timer T5 expired, gateID: 38
Jul 25 14:28:57.450 UTC: Pktcbl(gdb): Started gate [id 38] timer t5 [500 msec]
Jul 25 14:28:57.450 UTC: Pktcbl(g2g): Retransmitting message: GATE_CLOSE, gateID: 38
Jul 25 14:28:57.950 UTC: Pktcbl: Timer event
Jul 25 14:28:57.950 UTC: Pktcbl(g2g): Timer T5 expired, gateID: 38
Jul 25 14:28:57.950 UTC: Pktcbl(gdb): Deleting gate IE, gateid = 38, total gateids [1]
Jul 25 14:28:57.950 UTC: Pktcbl(gdb): Deleting subs IE, subs id = 3.3.1.3

```

Router#

| Related Commands | Command                       | Description                                                                                                                                                               |
|------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>debug cops</b>             | Displays debugging messages related to the COPS protocol.                                                                                                                 |
|                  | <b>debug packetcable cops</b> | Enables debugging of Common Open Policy Service (COPS) messages and errors that are related to PacketCable operations on the Cisco CMTS router.                           |
|                  | <b>debug packetcable gate</b> | Displays general debugging messages related to specific PacketCable gate events and messages.                                                                             |
|                  | <b>debug packetcable hccp</b> | Enables debugging messages for events that are related to Hot Standby Connection-to-Connection Protocol (HCCP) N+1 redundancy synchronization for PacketCable operations. |

 **debug packetcable all**

| Command                             | Description                                                                                                        |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>debug packetcable ipc</b>        | Enables interprocess communications (IPC) messages related to PacketCable operations on the Cisco uBR10012 router. |
| <b>debug packetcable subscriber</b> | Enables PacketCable debugging for a specific subscriber IP address.                                                |

# debug packetcable cops

To enable debugging of Common Open Policy Service (COPS) messages and errors that are related to PacketCable operations on the Cisco CMTS router, use the **debug packetcable cops** command in privileged EXEC mode. To turn off this debugging, use the **no** form of this command.

**debug packetcable cops**

**no debug packetcable cops**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                                                                                         |
|-----------------|-------------|------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC1 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers. |

**Usage Guidelines** This command enables debugging for the COPS messages and errors that are related to PacketCable operations. It produces output that is similar to the **debug cops** command, except that the output for this command is limited to the use of the COPS protocol to support PacketCable connections.

**Examples** The following example shows typical debugging output for the **debug packetcable cops** command:

```
Router# debug packetcable cops
Pktcbl COPS msgs debugging is on

Router#

Aug 21 12:41:23 UTC: Pktcbl(cops): Reallocating message buffer to 256 bytes
Aug 21 12:41:23 UTC: Pktcbl(cops): COPS header not valid
Aug 21 12:41:23 UTC: Pktcbl(cops): Not a valid COPS object [class: 31]
Aug 21 12:41:23 UTC: Pktcbl(cops): Last object [class: 31] not fully contained in COPS msg
Aug 21 12:41:23 UTC: Pktcbl(cops): No entry for the server! (client_accept)

Aug 21 12:43:41 UTC: PktCbl(cops): Received callback [code 7, handle: 0x64911528] from
COPS engine
Aug 21 12:43:41 UTC: PktCbl(cops): Remove GC (64911528)
Aug 21 12:43:42 UTC: PktCbl(cops): Received callback [code 8, handle: 0x64463AA4] from
COPS engine
Aug 21 12:43:42 UTC: PktCbl(cops): Incoming TCP connect from GC (1.10.90.1)
Aug 21 12:43:42 UTC: PktCbl(cops): Received callback [code 4, handle: 0x64463AA4] from
COPS engine
Aug 21 12:43:42 UTC: PktCbl(cops): Received COPS CLIENT_ACCEPT [tcp handle: 0x64463AA4]
```

| Related Commands | Command                             | Description                                                                                                                                                               |
|------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>debug cops</b>                   | Displays debugging messages related to the COPS protocol.                                                                                                                 |
|                  | <b>debug packetcable all</b>        | Displays general debugging messages for all PacketCable events.                                                                                                           |
|                  | <b>debug packetcable gate</b>       | Displays general debugging messages related to specific PacketCable gate events and messages.                                                                             |
|                  | <b>debug packetcable hccp</b>       | Enables debugging messages for events that are related to Hot Standby Connection-to-Connection Protocol (HCCP) N+1 redundancy synchronization for PacketCable operations. |
|                  | <b>debug packetcable ipc</b>        | Enables interprocess communications (IPC) messages related to PacketCable operations on the Cisco uBR10012 router.                                                        |
|                  | <b>debug packetcable subscriber</b> | Enables PacketCable debugging for a specific subscriber IP address.                                                                                                       |



# debug packetcable gate

To display general debugging messages for specific PacketCable gate events and messages, use the **debug packetcable gate** command in privileged EXEC mode. To turn off Packetcable debugging, use the **no** form of this command.

```
debug packetcable gate { commit | control | coordination | database | docsis-mapping |
events [process] } [detail]
```

```
no debug packetcable gate { commit | control | coordination | database | docsis-mapping |
events [process] } [detail]
```

| Syntax Description    |             |                                                                                                                                                   |
|-----------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>commit</b>         |             | Displays debugging messages for the commit events on each gate.                                                                                   |
| <b>control</b>        |             | Displays debugging messages for gate control events (allocation, set, and delete).                                                                |
| <b>coordination</b>   |             | Displays debugging messages for gate coordination events (gate close and open) (not supported in Release 12.2(15)BC1 and later releases).         |
| <b>database</b>       |             | Displays debugging messages for all updates to the gate database, including gate creation and deletion, state transitions, and structure updates. |
| <b>docsis-mapping</b> |             | Displays debugging messages for the mapping between PacketCable and Data-over-Cable System Interface Specification (DOCSIS) parameters.           |
| <b>events</b>         |             | Displays debugging messages for the event messages that are sent during a voice call.                                                             |
| <b>process</b>        |             | (Optional) Displays non-subscriber-related process event messages (available only when using the <b>events</b> option).                           |
| <b>detail</b>         |             | Displays additional debug messages for specific events, such as the contents of a PacketCable headers and messages.                               |
|                       | <b>Note</b> | Release 12.2(15)BC1 removed this option and replaced it with the <b>verbose</b> option of the <b>debug packetcable subscriber</b> command.        |

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | Release     | Modification                                                                                                                                                                                                                                                                                                                                            |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(8)BC2  | This command was introduced for the Cisco uBR7200 series universal broadband router.                                                                                                                                                                                                                                                                    |
|                 | 12.2(15)BC1 | The <b>coordination</b> and <b>detail</b> options were removed, and the <b>process</b> option was added. Support was also added for the Cisco uBR10012 router. In addition, most options no longer display any output until PacketCable debugging has been enabled for one or more IP addresses, using the <b>debug packetcable subscriber</b> command. |
|                 | 12.2(15)BC2 | The <b>hccp</b> option was added.                                                                                                                                                                                                                                                                                                                       |

**Usage Guidelines**

Use this command to enable debugging for the individual PacketCable functional systems on the Cisco CMTS. As a general rule, selectively use these commands to debug or troubleshoot problems instead of turning on all debugging with the **debug packetcable all** command.

In Cisco IOS Release 12.2(15)BC1 and later, you must also enable debugging for one or more IP addresses, using the **debug packetcable subscriber** command, before the **debug packetcable gate** command displays any output. The **debug packetcable gate events process** command is an exception to this, however, because it does not display subscriber-related information.

**Note**

The **debug packetcable all** command is equivalent to repeatedly giving the **debug packetcable gate** command with each of its possible options.

**Tip**

To display detailed debugging output in Cisco IOS Release 12.2(15)BC1 and later releases, use the **verbose** option when you enable PacketCable debugging output using the **debug packetcable subscriber** command.

**Examples**

This section shows typical examples for each type of debugging message.

**Commit Event Debugging**

The following example shows typical debugging messages for the commit events on a gate. Omit the **verbose** option if you do not want to display the header and message contents.

```
Router# debug packetcable subscriber 192.168.78.21 verbose
```

```
Router# debug packetcable commit
```

```
Pktcbl commit msgs (detail) debugging is on
```

```
Jul 25 16:13:34 UTC: Pktcbl(Commit): Commit msg from [addr/port 192.168.78.21/50024],
length 40
Jul 25 16:13:34 UTC: Pktcbl(Commit): (commit) - Calling DOCSIS QoS module Commit
Jul 25 16:13:34 UTC: Pktcbl(Commit): rsvp->docsis: Received a DOCSIS_COMMIT request
Jul 25 16:13:34 UTC: Pktcbl(Commit): Sending COMMIT response [241] [src
192.168.78.1/50024, dest 192.168.78.21/50024]
Jul 25 16:13:34 UTC: Commit Header
Jul 25 16:13:34 UTC: ver (0x) : 01
Jul 25 16:13:34 UTC: msg type : COMMIT_ACK [241]
Jul 25 16:13:34 UTC: checksum : 1D 4D
Jul 25 16:13:34 UTC: sending ttl : 255
Jul 25 16:13:34 UTC: msg length : 40
Jul 25 16:13:34 UTC: Destination 192.168.78.19, Protocol_Id 17, Don't Police , DstPort
20362
Jul 25 16:13:34 UTC: Source 192.168.78.21, udp_source_port 20380
Jul 25 16:13:34 UTC: GATE_ID type 8 length 8 :
Jul 25 16:13:34 UTC: Id = 2430632
Jul 25 16:13:34 UTC: Pktcbl(Commit): Sending COMMIT response [241] [src
192.168.78.1/50024, dest 192.168.78.21/50024]
Jul 25 16:13:34 UTC: Commit Header
Jul 25 16:13:34 UTC: ver (0x) : 01
Jul 25 16:13:34 UTC: msg type : COMMIT_ACK [241]
Jul 25 16:13:34 UTC: checksum : 1D 4D
Jul 25 16:13:34 UTC: sending ttl : 255
Jul 25 16:13:34 UTC: msg length : 40
Jul 25 16:13:34 UTC: Destination 192.168.78.19, Protocol_Id 17, Don't Police , DstPort
20362
Jul 25 16:13:34 UTC: Source 192.168.78.21, udp_source_port 20380
Jul 25 16:13:34 UTC: GATE_ID type 8 length 8 :
```

```

Jul 25 16:13:34 UTC: Id = 2430632
Jul 25 16:13:34 UTC: Pktcbl(Commit): Commit msg from [addr/port 192.168.78.19/50024],
length 40
Jul 25 16:13:34 UTC: Pktcbl(Commit): (commit) - Calling DOCSIS QoS module Commit
Jul 25 16:13:34 UTC: Pktcbl(Commit): Sending COMMIT response [241] [src
192.168.78.1/50024, dest 192.168.78.19/50024]
Jul 25 16:13:34 UTC: Commit Header
Jul 25 16:13:34 UTC: ver (0x) : 01
Jul 25 16:13:34 UTC: msg type : COMMIT_ACK [241]
Jul 25 16:13:34 UTC: checksum : 33 FFFFFFF96
Jul 25 16:13:34 UTC: sending ttl : 255
Jul 25 16:13:34 UTC: msg length : 40
Jul 25 16:13:34 UTC: Destination 192.168.78.21, Protocol_Id 17, Don't Police , DstPort
20380
Jul 25 16:13:34 UTC: Source 192.168.78.19, udp_source_port 20362
Jul 25 16:13:34 UTC: GATE_ID type 8 length 8 :
Jul 25 16:13:34 UTC: Id = 2359392

```

### Gate Control Event Debugging

The following example shows typical debugging messages for gate control events. Omit the **verbose** option if you do not want to display the header and message contents.

```
Router# debug packetcable subscriber 192.168.78.21 verbose
```

```
Router# debug packetcable control
```

```
Pktcbl gate control msgs (detail) debugging is on
```

```

Jul 25 16:23:15 UTC: Pktcbl(gcp): Received a COPS DEC message
Jul 25 16:23:15 UTC: --- Pktcbl(gcp): Received GCP message -----
Jul 25 16:23:15 UTC: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
Jul 25 16:23:15 UTC: transaction id : 0x5
Jul 25 16:23:15 UTC: gcp cmd : 1 (GATE_ALLOC)
Jul 25 16:23:15 UTC: SUBSCRIBER ID (IPv4) : Object.[snum/stype/len 2/1/8]
Jul 25 16:23:15 UTC: Addr : 192.168.78.19
Jul 25 16:23:15 UTC: ACTIVITY COUNT : Object.[snum/stype/len 4/1/8]
Jul 25 16:23:15 UTC: Count : 10
Jul 25 16:23:15 UTC: -----
Jul 25 16:23:15 UTC: Pktcbl(gcp): Building GCP message:added obj TRANSACTION ID ;
len:8 padding:0
Jul 25 16:23:15 UTC: Pktcbl(gcp): Building GCP message:added obj SUBSCRIBER ID (IPv4);
len:8 padding:0
Jul 25 16:23:15 UTC: Pktcbl(gcp): Building GCP message:added obj GATE ID ;
len:8 padding:0
Jul 25 16:23:15 UTC: Pktcbl(gcp): Building GCP message:added obj ACTIVITY COUNT ;
len:8 padding:0
Jul 25 16:23:15 UTC: Pktcbl(gcp): Building GCP message:added obj GCOORD PORT ;
len:8 padding:0
Jul 25 16:23:15 UTC: Pktcbl(gcp): Built GCP message, GATE_ALLOC ACK , length: 40,
copsLen 68
Jul 25 16:23:15 UTC: --- Pktcbl(gcp): Sending GCP message -----
Jul 25 16:23:15 UTC: TRANSACTION ID : Object.[snum/stype/len 1/1/8]
Jul 25 16:23:15 UTC: transaction id : 0x5
Jul 25 16:23:15 UTC: gcp cmd : 2 (GATE_ALLOC_ACK)
Jul 25 16:23:15 UTC: SUBSCRIBER ID (IPv4) : Object.[snum/stype/len 2/1/8]
Jul 25 16:23:15 UTC: Addr : 192.168.78.19
Jul 25 16:23:15 UTC: GATE ID : Object.[snum/stype/len 3/1/8]
Jul 25 16:23:15 UTC: GateID : 2359392 (0x240060)
Jul 25 16:23:15 UTC: ACTIVITY COUNT : Object.[snum/stype/len 4/1/8]
Jul 25 16:23:15 UTC: Count : 1
Jul 25 16:23:15 UTC: GCOORD PORT : Object.[snum/stype/len 12/1/8]
Jul 25 16:23:15 UTC: gcoord port : [50048]
Jul 25 16:23:15 UTC: -----
Jul 25 16:23:15 UTC: --- Pktcbl(gcp): Received GCP message -----
Jul 25 16:23:15 UTC: TRANSACTION ID : Object.[snum/stype/len 1/1/8]

```

## debug packetcable gate

```

Jul 25 16:23:15 UTC: transaction id : 0x7
Jul 25 16:23:15 UTC: gcp cmd : 4 (GATE SET)
Jul 25 16:23:15 UTC: SUBSCRIBER ID (IPv4) : Object.[snum/stype/len 2/1/8]
Jul 25 16:23:15 UTC: Addr : 192.168.78.21
Jul 25 16:23:15 UTC: GATE ID : Object.[snum/stype/len 3/1/8]
Jul 25 16:23:15 UTC: GateID : 2430632 (0x2516A8)
Jul 25 16:23:15 UTC: REMOTE GATE INFO : Object.[snum/stype/len 6/1/33]
Jul 25 16:23:15 UTC: gateid : 2359392
Jul 25 16:23:15 UTC: addr/port : 192.168.2.236/0xC380
Jul 25 16:23:15 UTC: gcoord flag : 0x0
Jul 25 16:23:15 UTC: algo : 100
Jul 25 16:23:15 UTC: security key : [F6 B1 AF D2 26 35 76 11 11 73 EB 3D 07 6A 13
B7]
Jul 25 16:23:15 UTC: EVENT GNRTN INFO : Object.[snum/stype/len 7/1/36]
Jul 25 16:23:15 UTC: primary RKS : [addr/port 192.168.2.240/26135]
Jul 25 16:23:15 UTC: secondary RKS : [addr/port 20.4.5.1/26391]
Jul 25 16:23:15 UTC: flags : 0x0
Jul 25 16:23:15 UTC: billing corr ID : [3A 12 35 B1 61 38 63 30 65 37 30 32 00 00 00
01]
Jul 25 16:23:15 UTC: MEDIA CNX EVENT INFO : Object.[snum/stype/len 8/1/84]
Jul 25 16:23:15 UTC: called party # : [39 37 38 32 34 34 31 31 33 33 00 00 00 00 00
00 00 00 00 00]
Jul 25 16:23:15 UTC: routing number : [39 37 38 32 34 34 31 31 33 33 00 00 00 00 00
00 00 00 00 00]
Jul 25 16:23:15 UTC: charged number : [39 37 38 32 34 34 31 31 33 36 00 00 00 00 00
00 00 00 00 00]
Jul 25 16:23:15 UTC: locn. routing # : [39 37 38 32 34 34 31 31 33 36 00 00 00 00 00
00 00 00 00 00]
Jul 25 16:23:15 UTC: GATE SPEC : Object.[snum/stype/len 5/1/60]
Jul 25 16:23:15 UTC: direction : 1 (UPSTREAM)
Jul 25 16:23:15 UTC: protocol id : 17
Jul 25 16:23:15 UTC: commit flag : 0x0
Jul 25 16:23:15 UTC: session class : 1
Jul 25 16:23:15 UTC: source : 192.168.78.21
Jul 25 16:23:15 UTC: dest : 192.168.78.19
Jul 25 16:23:15 UTC: src port : 20380 (0x4F9C)
Jul 25 16:23:15 UTC: dest port : 20362 (0x4F8A)
Jul 25 16:23:15 UTC: dscp : 0x78
Jul 25 16:23:15 UTC: timer t1 : 300000
Jul 25 16:23:15 UTC: timer t2 : 2000000
Jul 25 16:23:15 UTC: flowspec # 1 : [r/b/p/m/M
1176256512/1128792064/1176256512/0/200] [R/S: 1176256512/0]
Jul 25 16:23:15 UTC: GATE SPEC : Object.[snum/stype/len 5/1/60]
Jul 25 16:23:15 UTC: direction : 0 (DOWNSTREAM)
Jul 25 16:23:15 UTC: protocol id : 17
Jul 25 16:23:15 UTC: commit flag : 0x0
Jul 25 16:23:15 UTC: session class : 1
Jul 25 16:23:15 UTC: source : 192.168.78.19
Jul 25 16:23:15 UTC: dest : 192.168.78.21
Jul 25 16:23:15 UTC: src port : 20362 (0x4F8A)
Jul 25 16:23:15 UTC: dest port : 20380 (0x4F9C)
Jul 25 16:23:15 UTC: dscp : 0x78
Jul 25 16:23:15 UTC: timer t1 : 300000
Jul 25 16:23:15 UTC: timer t2 : 2000000
Jul 25 16:23:15 UTC: flowspec # 1 : [r/b/p/m/M
1176256512/1128792064/1176256512/0/200] [R/S: 1176256512/0]
Jul 25 16:23:15 UTC: SDP PARAMS : Object.[snum/stype/len 11/1/348]

```

### Gate Coordination Event Debugging

The following example shows typical debugging messages for gate coordination events. Omit the **verbose** option if you do not want to display the header and message contents.



#### Note

The **coordination** option was removed in Cisco IOS Release 12.2(15)BC1.

```
Router# debug packetcable subscriber 192.168.78.21 verbose
Router# debug packetcable coordination
Pktcbl gate coord msgs (detail) debugging is on

Jul 25 14:35:17.661 UTC: Pktcbl(g2g): received GATE_OPEN message, tid 10
Jul 25 14:35:17.661 UTC: --- Pktcbl(g2g): Received G2G message -----
Jul 25 14:35:17.665 UTC: G2G message header
Jul 25 14:35:17.665 UTC: Type : GATE_OPEN
Jul 25 14:35:17.665 UTC: TransactionID : 10
Jul 25 14:35:17.665 UTC: Msg Length : 28
Jul 25 14:35:17.665 UTC: Auth (hex) : 18 88 CB A2 55 9A 6B 19 3D DB 7B AD 83 FC FC
E9
Jul 25 14:35:17.665 UTC: GATE ID : Object.[type/len 224/8]
Jul 25 14:35:17.665 UTC: GateID : 102 (0x66)
Jul 25 14:35:17.665 UTC: -----
Jul 25 14:35:17.665 UTC: Pktcbl(g2g): auth_request: 0x18 88 CB A2 55 9A 6B 19 3D DB 7B AD
83 FC FC E9
Jul 25 14:35:17.665 UTC: Pktcbl(g2g): sending g2g GATE_OPEN_ACK message to
192.168.80.15:1812 from 192.168.80.1:50048
Jul 25 14:35:17.665 UTC: --- Pktcbl(g2g): Sending G2G message -----
Jul 25 14:35:17.665 UTC: G2G message header
Jul 25 14:35:17.665 UTC: Type : GATE_OPEN_ACK
Jul 25 14:35:17.665 UTC: TransactionID : 10
Jul 25 14:35:17.665 UTC: Msg Length : 28
Jul 25 14:35:17.665 UTC: Auth (hex) : 1A CA 3E 2D B4 D3 18 B9 4D DC 06 C8 98 71 E8
31
Jul 25 14:35:17.665 UTC: GATE ID : Object.[type/len 224/8]
Jul 25 14:35:17.665 UTC: GateID : 102 (0x66)
Jul 25 14:35:17.665 UTC: -----
Jul 25 14:35:18.181 UTC: Pktcbl(g2g): received GATE_OPEN message, tid 10
Jul 25 14:35:18.181 UTC: --- Pktcbl(g2g): Received G2G message -----
Jul 25 14:35:18.181 UTC: G2G message header
Jul 25 14:35:18.181 UTC: Type : GATE_OPEN
Jul 25 14:35:18.181 UTC: TransactionID : 10
Jul 25 14:35:18.181 UTC: Msg Length : 28
Jul 25 14:35:18.181 UTC: Auth (hex) : 18 88 CB A2 55 9A 6B 19 3D DB 7B AD 83 FC FC
E9
Jul 25 14:35:18.181 UTC: GATE ID : Object.[type/len 224/8]
Jul 25 14:35:18.181 UTC: GateID : 102 (0x66)
Jul 25 14:35:18.181 UTC: -----
Jul 25 14:35:18.181 UTC: Pktcbl(g2g): Duplicate GATE-OPEN for gateID: 102, not processing
it, sending GATE-OPEN-ACK
Jul 25 14:35:18.181 UTC: Pktcbl(g2g): sending g2g GATE_OPEN_ACK message to
192.168.80.15:1812 from 192.168.80.1:50048
Jul 25 14:35:18.181 UTC: --- Pktcbl(g2g): Sending G2G message -----
Jul 25 14:35:18.181 UTC: G2G message header
Jul 25 14:35:18.181 UTC: Type : GATE_OPEN_ACK
Jul 25 14:35:18.181 UTC: TransactionID : 10
Jul 25 14:35:18.181 UTC: Msg Length : 28
Jul 25 14:35:18.181 UTC: Auth (hex) : 1A CA 3E 2D B4 D3 18 B9 4D DC 06 C8 98 71 E8
31
Jul 25 14:35:18.181 UTC: GATE ID : Object.[type/len 224/8]
Jul 25 14:35:18.181 UTC: GateID : 102 (0x66)
Jul 25 14:35:18.185 UTC: -----
Jul 25 14:35:19.705 UTC: Pktcbl(g2g): received GATE_OPEN message, tid 10
```

```

Jul 25 14:35:19.705 UTC: --- Pktcbl(g2g): Received G2G message -----
Jul 25 14:35:19.705 UTC: G2G message header
Jul 25 14:35:19.705 UTC: Type : GATE_OPEN
Jul 25 14:35:19.705 UTC: TransactionID : 10
Jul 25 14:35:19.705 UTC: Msg Length : 28
Jul 25 14:35:19.705 UTC: Auth (hex) : 18 88 CB A2 55 9A 6B 19 3D DB 7B AD 83 FC FC
E9
Jul 25 14:35:19.705 UTC: GATE ID : Object.[type/len 224/8]
Jul 25 14:35:19.709 UTC: GateID : 102 (0x66)
Jul 25 14:35:19.709 UTC: -----
Jul 25 14:35:19.709 UTC: Pktcbl(g2g): Duplicate GATE-OPEN for gateID: 102, not processing
it, sending GATE-OPEN-ACK
Jul 25 14:35:19.709 UTC: Pktcbl(g2g): sending g2g GATE_OPEN_ACK message to
192.168.80.15:1812 from 192.168.80.1:50048
Jul 25 14:35:19.709 UTC: --- Pktcbl(g2g): Sending G2G message -----
Jul 25 14:35:19.709 UTC: G2G message header
Jul 25 14:35:19.709 UTC: Type : GATE_OPEN_ACK
Jul 25 14:35:19.709 UTC: TransactionID : 10
Jul 25 14:35:19.709 UTC: Msg Length : 28
Jul 25 14:35:19.709 UTC: Auth (hex) : 1A CA 3E 2D B4 D3 18 B9 4D DC 06 C8 98 71 E8
31
Jul 25 14:35:19.709 UTC: GATE ID : Object.[type/len 224/8]
Jul 25 14:35:19.709 UTC: GateID : 102 (0x66)
Jul 25 14:35:19.709 UTC: -----

```

**Note**

The GATE\_OPEN and GATE\_CLOSE messages show the gate ID of the remote gate, not the local gate.

**Gate Database Debugging**

The following example shows typical debugging messages for gate database events:

```

Router# debug packetcable subscriber 192.168.78.21
Router# debug packetcable database
Pktcbl gate database changes debugging is on

Jul 25 16:17:29 UTC: Pktcbl(gdb): Allocated gateid 2359392 0x240060 (bucket 0x24, 0x60)
Jul 25 16:17:29 UTC: Pktcbl(gdb): Created new Subscriber IE for 192.168.78.19
Jul 25 16:17:29 UTC: Pktcbl(gdb): Updated subscriber IE [subs addr: 192.168.78.19, gate:
2359392]
Jul 25 16:17:29 UTC: Pktcbl(gdb): Created gate IE, gateid = 2359392, total gates: 1
Jul 25 16:17:29 UTC: Pktcbl(gdb): Started gate [id 2359392] timer t0 [30 sec]
Jul 25 16:17:29 UTC: Pktcbl(gdb): Allocated gateid 2430632 0x2516A8 (bucket 0x25, 0x16A8)
Jul 25 16:17:29 UTC: Pktcbl(gdb): Created new Subscriber IE for 192.168.78.21
Jul 25 16:17:29 UTC: Pktcbl(gdb): Updated subscriber IE [subs addr: 192.168.78.21, gate:
2430632]
Jul 25 16:17:29 UTC: Pktcbl(gdb): Created gate IE, gateid = 2430632, total gates: 2
Jul 25 16:17:29 UTC: Pktcbl(gdb): Started gate [id 2430632] timer t0 [30 sec]
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2430632 direction
downstream to state 2
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2430632 direction
downstream to state 2
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2430632 direction
downstream to state 2
Jul 25 16:17:29 UTC: Pktcbl(gdb): Stopped gate [id 2430632] timer [type 1]
Jul 25 16:17:29 UTC: Pktcbl(gdb): Started gate [id 2430632] timer t1 [300 sec]
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2359392 direction
downstream to state 2
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2359392 direction
downstream to state 2
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2359392 direction
downstream to state 2
Jul 25 16:17:29 UTC: Pktcbl(gdb): Stopped gate [id 2359392] timer [type 1]
Jul 25 16:17:29 UTC: Pktcbl(gdb): Started gate [id 2359392] timer t1 [300 sec]

```

```

Jul 25 16:17:29 UTC: Pktcbl(gdb): request to set gate state to 3 in upstream direction for
gate handle 622D3650
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2430632 direction upstream
to state 3
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to set gate state to 3 in downstream direction
for gate handle 622D3650
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2430632 direction
downstream to state 3
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to set gate state to 3 in upstream direction for
gate handle 622C3EF8
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2359392 direction upstream
to state 3
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to set gate state to 3 in downstream direction
for gate handle 622C3EF8
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2359392 direction
downstream to state 3
Jul 25 16:17:29 UTC: Pktcbl(gdb): request to transition gate ID 2430632 direction upstream
to state 4
Jul 25 16:17:29 UTC: Pktcbl(gdb): Started gate [id 2430632] timert2 [2000000 ms]
Jul 25 16:17:29 UTC: Pktcbl(gdb): Started gate [id 2430632] timer t5 [500 msec]
Jul 25 16:17:29 UTC: Pktcbl(gdb): Cancelled gate [id 2430632] timer t1
Jul 25 16:17:29 UTC: Pktcbl(gdb): Cancelled gate [id 2430632] timer t2
Jul 25 16:17:29 UTC: Pktcbl(gdb): Cancelled gate [id 2430632] timer t5

```

### DOCSIS-to-RSVP Mapping Debugging

The following example shows typical debugging messages for the mapping between DOCSIS and RSVP messages:

```
Router# debug packetcable subscriber 192.168.78.21
```

```
Router# debug packetcable docsis-mapping
```

```
Pktcbl rsvp-to-docsis msgs debugging is on
```

```

Jul 25 16:17:33 UTC: Pktcbl(d2r): rsvp->docsis: Received a DOCSIS_RESERVE request
Jul 25 16:17:33 UTC: Pktcbl(d2r): rsvp->docsis: Received a DOCSIS_RESERVE request
Jul 25 16:17:33 UTC: Pktcbl(d2r): docsis->rsvp, DSA received, gateid: 2430632
Jul 25 16:17:33 UTC: Pktcbl(d2r): Notifying RSVP layer of CM initiated req
[api_msg.opcode: 4]
Jul 25 16:17:33 UTC: Pktcbl(d2r): docsis->rsvp, DSA received, gateid: 2359392
Jul 25 16:17:33 UTC: Pktcbl(d2r): Notifying RSVP layer of CM initiated req
[api_msg.opcode: 4]
Jul 25 16:17:33 UTC: Pktcbl(d2r): rsvp->docsis: Received a DOCSIS_COMMIT request
Jul 25 16:17:33 UTC: Pktcbl(d2r): rsvp->docsis: Received a DOCSIS_COMMIT request
Jul 25 16:17:33 UTC: Pktcbl(d2r): request to transition gate ID 2359392 direction upstream
to state 4

```

### Event Message Debugging

The following example shows typical debugging messages for event messages:

```
Router# debug packetcable subscriber 192.168.78.21
```

```
Router# debug packetcable events
```

```
Pktcbl event msgs debugging is on
```

```

Jul 25 16:14:41 UTC: Pktcbl(em): RKS send call-answer for gate_id=2430632
Jul 25 16:14:41 UTC: Pktcbl(em): pktcbl_send_event() event_type=CALL_ANSWER port=0
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes, attr_id=1
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes(ATTR_HEADER)
Jul 25 16:14:41 UTC: Pktcbl(em): pktcbl_add_header(): seq_no=136
event_time=19170628064103.06 event_msg_type=15
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes, attr_id=5
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes(ATTR_PARTY_NUMBER)
Jul 25 16:14:41 UTC: Pktcbl(em): length=28, vendor_attr_length=22
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes, attr_id=16
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes(ATTR_CHARGE_NUMBER)

```

**debug packetcable gate**

```

Jul 25 16:14:41 UTC: Pktcbl(em): length=28, vendor_attr_length=22
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes, attr_id=22
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes(ATTR_LOC_ROUTING_NUMBER)
Jul 25 16:14:41 UTC: Pktcbl(em): length=28, vendor_attr_length=22
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes, attr_id=25
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes(ATTR_ROUTING_NUMBER)
Jul 25 16:14:41 UTC: Pktcbl(em): length=28, vendor_attr_length=22
Jul 25 16:14:41 UTC: Pktcbl(em): RKS send qos-start for gate_id=2430632
Jul 25 16:14:41 UTC: Pktcbl(em): pktcbl_send_event() event_type=QOS_START port=0
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes, attr_id=1
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes(ATTR_HEADER)
Jul 25 16:14:41 UTC: Pktcbl(em): pktcbl_add_header(): seq_no=137
event_time=19170628064103.06 event_msg_type=7
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes, attr_id=26
Jul 25 16:14:41 UTC: Pktcbl(em): add_attributes(ATTR_MTA_UDP_PORTNUM)
Jul 25 16:14:41 UTC: Pktcbl(em): length=12, vendor_attr_length=6

```

**Note**

Use the **debug packetcable events process** command to display timing-related information for PacketCable events.

**Related Commands**

| Command                             | Description                                                                                                                                                               |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>debug cops</b>                   | Displays debugging messages related to the COPS protocol.                                                                                                                 |
| <b>debug packetcable all</b>        | Displays general debugging messages for all PacketCable events.                                                                                                           |
| <b>debug packetcable cops</b>       | Enables debugging of Common Open Policy Service (COPS) messages and errors that are related to PacketCable operations on the Cisco CMTS router.                           |
| <b>debug packetcable hccp</b>       | Enables debugging messages for events that are related to Hot Standby Connection-to-Connection Protocol (HCCP) N+1 redundancy synchronization for PacketCable operations. |
| <b>debug packetcable ipc</b>        | Enables interprocess communications (IPC) messages related to PacketCable operations on the Cisco uBR10012 router.                                                        |
| <b>debug packetcable subscriber</b> | Enables PacketCable debugging for a specific subscriber IP address.                                                                                                       |



# debug packetcable hccp

To display debugging messages for events that are related to Hot Standby Connection-to-Connection Protocol (HCCP) N+1 redundancy synchronization for PacketCable operations, use the **debug packetcable hccp** command in privileged EXEC mode. To turn off the debugging, use the **no** form of this command.

**debug packetcable hccp**

**no debug packetcable hccp**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                                                                                         |
|-----------------|-------------|------------------------------------------------------------------------------------------------------|
|                 | 12.2(15)BC2 | This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers. |

**Usage Guidelines** Use this command to enable debugging for events that are related to HCCP redundancy operations that are related to PacketCable operations on the Cisco CMTS. These debugging messages show errors that occurred when the Cisco CMTS was synchronizing the PacketCable databases and state information between the Working and Protect interfaces.

**Examples** The following example shows a typical debugging message for the **debug packetcable hccp** command.

```
Router# debug packetcable hccp
```

```
Pktcbl HCCP msgs debugging is on
```

```
Pktcbl(gdb): gdb pointer is null for if_index = 13, gid = 3
```



**Tip**

The above debug message indicates that the Cisco CMTS was synchronizing the PacketCable gate database on the Protect interface at the same time a PacketCable gate was in the process of being created. Because the gate had not yet been fully initialized, the synchronization of the gate database had incomplete information about the gate. This is typically a temporary condition that is resolved at the next synchronization of the interfaces.

| Related Commands | Command                      | Description                                                     |
|------------------|------------------------------|-----------------------------------------------------------------|
|                  | <b>debug cops</b>            | Displays debugging messages related to the COPS protocol.       |
|                  | <b>debug hccp sync</b>       | Displays debug messages for HCCP synchronization messages.      |
|                  | <b>debug packetcable all</b> | Displays general debugging messages for all PacketCable events. |

| Command                       | Description                                                                                                                                     |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>debug packetcable cops</b> | Enables debugging of Common Open Policy Service (COPS) messages and errors that are related to PacketCable operations on the Cisco CMTS router. |
| <b>debug packetcable gate</b> | Displays general debugging messages related to specific PacketCable gate events and messages.                                                   |
| <b>debug packetcable ipc</b>  | Enables interprocess communications (IPC) messages related to PacketCable operations on the Cisco uBR10012 router.                              |

# debug packetcable ipc

To enable interprocess communications (IPC) messages related to PacketCable operations on the Cisco uBR10012 router, use the **debug packetcable ipc** command in privileged EXEC mode. To turn off Packetcable IPC debugging, use the **no** form of this command.

**debug packetcable ipc**

**no debug packetcable ipc**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

| Command History | Release     | Modification                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------|
|                 | 12.2(15)BC1 | This command was introduced for the Cisco uBR10012 universal broadband router. |

**Usage Guidelines** This command enables debugging for the IPC messages that are sent between the PRE1 module and cable interface line cards on the Cisco uBR10012 router during PacketCable operations. This command is not supported on the Cisco uBR7200 series router because this router does not use IPC messaging for PacketCable operations.



**Tip**

On the Cisco uBR10012 router, the **debug packetcable ipc** command displays some of the debugging messages that are displayed on other Cisco CMTS platforms by the **control** option for the **debug packetcable gate** command.



**Note**

The **debug packetcable ipc** command does not display any output until you have also enabled PacketCable debugging for one or more IP addresses using the **debug packetcable subscriber** command.

**Examples** The following example shows typical debugging output for the **debug packetcable ipc** command:

```
Router# debug packetcable subscriber 10.10.10.131
Router# debug packetcable ipc
Debug pktcbl IPC messages debugging is on
Router#
```

```
Jul 26 08:51:34 UTC: Pktcbl(ipc): Delete gate [5123] notification sent from Cable 6/1/1 to RP
Jul 26 08:51:34 UTC: Pktcbl(ipc): Delete gate [5123] IPC received on LC
Jul 26 08:51:34 UTC: Pktcbl(ipc): Gate-set [5123] notification sent from Cable 6/1/1 to RP
Jul 26 08:51:34 UTC: Pktcbl(ipc): Create gate [5126] IPC sent to Cable 6/1/1
Jul 26 08:51:34 UTC: Pktcbl(ipc): Create gate [5126] IPC received on LC
```

debug packetcable ipc

```

Jul 26 08:51:34 UTC: Pktcbl(ipc): Gate-set response [5126] IPC message received on RP
Jul 26 08:54:17 UTC: Pktcbl(ipc): Create gate [7173] IPC sent to Cable6/1/1
Jul 26 08:54:17 UTC: Pktcbl(ipc): Gate-set [7173] ipc sent to Cable6/1/1
Jul 26 08:54:17 UTC: Pktcbl(ipc): Gate-set response [7173] IPC message received on RP

```

| Related Commands | Command                             | Description                                                                                                                                                               |
|------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>debug cops</b>                   | Displays debugging messages related to the COPS protocol.                                                                                                                 |
|                  | <b>debug packetcable all</b>        | Displays general debugging messages for all PacketCable events.                                                                                                           |
|                  | <b>debug packetcable cops</b>       | Enables debugging of Common Open Policy Service (COPS) messages and errors that are related to PacketCable operations on the Cisco CMTS router.                           |
|                  | <b>debug packetcable gate</b>       | Displays general debugging messages related to specific PacketCable gate events and messages.                                                                             |
|                  | <b>debug packetcable hccp</b>       | Enables debugging messages for events that are related to Hot Standby Connection-to-Connection Protocol (HCCP) N+1 redundancy synchronization for PacketCable operations. |
|                  | <b>debug packetcable subscriber</b> | Enables PacketCable debugging for a specific subscriber IP address.                                                                                                       |

# debug packetcable subscriber

To enable PacketCable debugging for a specific subscriber IP address or subnet, use the **debug packetcable subscriber** command in privileged EXEC mode. To turn off Packetcable debugging for a particular IP address or subnet, use the **no** form of this command.

**debug packetcable subscriber** *ip-address* [*mask*] [**verbose**]

**no debug packetcable subscriber** *ip-address* [*mask*] [**verbose**]

## Syntax Description

|                   |                                                                                                                                                                                                                          |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i> | IP address for which PacketCable debugging should be enabled.                                                                                                                                                            |
| <i>mask</i>       | Subnet mask to use for this IP address. The router uses this mask to determine the scope of the IP addresses to be debugged. The default is 255.255.255.255 to indicate the IP address is a specific, single IP address. |
| <b>verbose</b>    | Displays detailed information as part of the debug messages, such as the contents of a PacketCable headers and messages.                                                                                                 |
| <b>Note</b>       | The <b>verbose</b> option replaces the <b>detail</b> option that appeared in previous versions of the other <b>debug packetcable</b> command.                                                                            |

## Command Modes

Privileged EXEC

## Command History

| Release     | Modification                                                                         |
|-------------|--------------------------------------------------------------------------------------|
| 12.2(15)BC1 | This command was introduced for the Cisco uBR7200 series universal broadband router. |

## Usage Guidelines

This command enables debugging for one or more specific PacketCable subscribers. This command by itself does not generate any debugging output, but enables debugging output for the other **debug packetcable** commands.

In Cisco IOS Release 12.2(15)BC1 and later releases, you must use the debug packet subscriber command to enable debugging for at least one IP address before the following **debug packetcable** commands will generate output:

- **debug packetcable gate commit**
- **debug packetcable gate control**
- **debug packetcable gate database**
- **debug packetcable gate docsis-mapping**
- **debug packetcable gate events**
- **debug packetcable ipc**



### Note

You do not need to use the debug packetcable subscribe command before using the **debug packetcable cops** and **debug packetcable gate events process** commands because these display information that is not subscriber-specific.

Examples

The following example shows how to enable PacketCable gate control debugging for one specific PacketCable subscriber at the IP address of 10.10.10.131:

```
Router# debug packetcable subscriber 10.10.10.131
Router# debug packetcable gate control
Router#
```

The following example shows how to enable PacketCable events debugging for all PacketCable subscribers within the 6.6.1.0 subnet:

```
Router# debug packetcable subscriber 6.6.1.0 255.255.255.0
Router# debug packetcable gate events
Router#
```

Related Commands

| Command                | Description                                                                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| debug cops             | Displays debugging messages related to the COPS protocol.                                                                                                                 |
| debug packetcable all  | Displays general debugging messages for all PacketCable events.                                                                                                           |
| debug packetcable cops | Enables debugging of Common Open Policy Service (COPS) messages and errors that are related to PacketCable operations on the Cisco CMTS router.                           |
| debug packetcable gate | Displays general debugging messages related to specific PacketCable gate events and messages.                                                                             |
| debug packetcable hccp | Enables debugging messages for events that are related to Hot Standby Connection-to-Connection Protocol (HCCP) N+1 redundancy synchronization for PacketCable operations. |
| debug packetcable ipc  | Enables interprocess communications (IPC) messages related to PacketCable operations on the Cisco uBR10012 router.                                                        |

# debug pxf

To enable debugging of the Parallel eXpress Forwarding (PXF) subsystems on the active Performance Routing Engine (PRE1) module on the Cisco uBR10012 router, use the **debug pxf** command in privileged EXEC mode. To disable debugging output, use the **no** form of the command.

**debug pxf {dma | microcode | stats | subblocks}**

**no debug pxf {dma | microcode | stats | subblocks}**

## Syntax Description

|                  |                                                                                                                                                                                                                                              |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dma</b>       | Displays debugging information for direct memory access (DMA) buffers, error counters, and registers on the PXF processor.                                                                                                                   |
| <b>microcode</b> | Disables the automatic reloading of the microcode on the PXF processors upon a crash or fault condition. (If a fault or crash occurs, you must manually load the microcode on the PXF processors using the <b>microcode reload</b> command.) |
| <b>stats</b>     | Displays debugging information for the statistics collector events on the PXF processor.                                                                                                                                                     |
| <b>subblocks</b> | Displays debugging information for changes in the subblocks onboard the PXF processor.                                                                                                                                                       |

## Command Modes

Privileged EXEC

## Command History

| Release    | Modification                                                                   |
|------------|--------------------------------------------------------------------------------|
| 12.2(4)BC1 | This command was introduced for the Cisco uBR10012 universal broadband router. |

## Usage Guidelines

The **debug pxf** command enables debugging of the different subsystems that are active on the PXF processors that are on the PRE1 modules in the Cisco uBR10012 router.

Also, by default the PRE1 modules automatically reload the microcode on the PXF processors in case of a crash or fault. The **debug pxf microcode** command disables this automatic reloading of the microcode, to allow further debugging. When you have finished debugging the PXF processor, you then must manually reload the microcode on the PXF processor using the **microcode reload** command.

## Examples

### debug pxf dma

The following example shows how to enable debugging of the DMA engine on the PXF processor, as well as typically debugging messages that appear for the packets sent and received by the **ping** command:

```
Router# debug pxf dma
```

```
PXF DMA ASIC debugging is on
```

```
Router# ping 11.1.1.1
```

```

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 11.1.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/8/8 ms

Router#

01:08:28: Entering c10k_cobalt_send.
01:08:28: Packet decode: datagramstart 0x067D14C8 length 116
01:08:28: Header decode: Chan 0, VCCI 2
01:08:28: Header decode: flags 0x0000
01:08:28: c10k_cobalt_send: Checked the idb state.
01:08:28: c10k_cobalt_send: Checked the FromRP Q count.
01:08:28: c10k_cobalt_send: Particle count 0.
01:08:28: Entering cobalt_pak_to_fromrp_ring_inline, scattered FALSE
01:08:28: cobalt_pak_to_fromrp_ring_inline from_rp_tail 13
01:08:28: Entering c10k_cobalt_type0_interrupt, status reg: 0x00000018.
01:08:28: ToRP Dispatched.
01:08:28: Entering cobalt_to_rp_interrupt.
01:08:28: cobalt_to_rp_interrupt: to_rp_head 28
01:08:28: cobalt_to_rp_interrupt: descriptor address 0x0672F900
01:08:28: descriptor buf pointer 0x0672AC00
01:08:28: descriptor buf length 114
01:08:28: descriptor buf flags 0x000C
01:08:28: cobalt_to_rp_interrupt, PAK DATA:
01:08:28: 0x00720012 0x180100FF 0x00000F00 0x08004500
01:08:28: 0x0064D02E 0x0000FF01 0xE9680100 0x00010100
01:08:28: 0x00010800 0xC68A80FF 0x26420000 0x0000003E
01:08:28: 0x1040ABCD 0xABCDABCD 0xABCDABCD 0xABCDABCD
01:08:28:
01:08:28: Entering cobalt_process_to_rp_packet.
01:08:28: Packet decode: datagramstart 0x0672AC00
01:08:28: Header decode: length 114, cause 0x0012
01:08:28: Header decode: rsrc_num 3, column 0
01:08:28: Header decode: flags 1
01:08:28: Cobalt packet passed to RP driver!
01:08:28: cobalt_to_rp_interrupt: to_rp_head 29
01:08:28: cobalt_to_rp_interrupt: descriptor address 0x0672F910
01:08:28: descriptor buf pointer 0x0672A980
01:08:28: descriptor buf length 114
01:08:28: descriptor buf flags 0x000C
01:08:28: cobalt_to_rp_interrupt, PAK DATA:
01:08:28: 0x00720012 0x280100FF 0x00000F00 0x08004500
01:08:28: 0x0064D02F 0x0000FF01 0xD3650B01 0x01010B01
01:08:28: 0x01010800 0x9AEB1885 0x1A1F0000 0x0000003E
01:08:28: 0xB07CABCD 0xABCDABCD 0xABCDABCD 0xABCDABCD
01:08:28:
01:08:28: Entering cobalt_process_to_rp_packet.
01:08:28: Packet decode: datagramstart 0x0672A980
01:08:28: Header decode: length 114, cause 0x0012
01:08:28: Header decode: rsrc_num 5, column 0
01:08:28: Header decode: flags 1
01:08:28: Cobalt packet passed to RP driver!
01:08:28: Exiting cobalt_to_rp_interrupt, to_rp_head 30, Packets processed 2
01:08:28: FromRP Dispatched.
01:08:28: Entering cobalt_from_rp_interrupt.
01:08:28: Cleaned descriptor 0x0672FB10.
01:08:28: desc buf ptr 0x00000000.
01:08:28: desc buf len 0x00000000.
01:08:28: desc buf flags 0x00000000.
01:08:28: ICMP: echo reply sent, src 11.1.1.1, dst 11.1.1.1
01:08:28: Entering c10k_cobalt_send.
01:08:28: Packet decode: datagramstart 0x067D1608 length 116
01:08:28: Header decode: Chan 0, VCCI 2

```



```
01:08:28: Header decode: flags 0x0000
01:08:28: c10k_cobalt_send: Checked the idb state.
01:08:28: c10k_cobalt_send: Checked the FromRP Q count.
01:08:28: c10k_cobalt_send: Particle count 0.
01:08:28: Entering cobalt_pak_to_fromrp_ring_inline, scattered FALSE
01:08:28: cobalt_pak_to_fromrp_ring_inline from_rp_tail 14
01:08:28: Entering c10k_cobalt_type0_interrupt, status reg: 0x00000018.
01:08:28: ToRP Dispatched.
01:08:28: Entering cobalt_to_rp_interrupt.
01:08:28: cobalt_to_rp_interrupt: to_rp_head 30
01:08:28: cobalt_to_rp_interrupt: descriptor address 0x0672F920
01:08:28: descriptor buf pointer 0x0672A700
01:08:28: descriptor buf length 114
01:08:28: descriptor buf flags 0x000C
01:08:28: cobalt_to_rp_interrupt, PAK DATA:
01:08:28: 0x00720012 0x280100FF 0x00000F00 0x08004500
01:08:28: 0x0064D02F 0x0000FF01 0xD3650B01 0x01010B01
01:08:28: 0x01010000 0xA2EB1885 0x1A1F0000 0x0000003E
01:08:28: 0xB07CABCD 0xABCDABCD 0xABCDABCD 0xABCDABCD
01:08:28:
01:08:28: Entering cobalt_process_to_rp_packet.
01:08:28: Packet decode: datagramstart 0x0672A700
01:08:28: Header decode: length 114, cause 0x0012
01:08:28: Header decode: rsrc_num 5, column 0
01:08:28: Header decode: flags 1
01:08:28: Cobalt packet passed to RP driver!
01:08:28: Exiting cobalt_to_rp_interrupt, to_rp_head 31, Packets processed 1
01:08:28: FromRP Dispatched.
01:08:28: Entering cobalt_from_rp_interrupt.
01:08:28: Cleaned descriptor 0x0672FB20.
01:08:28: desc buf ptr 0x00000000.
01:08:28: desc buf len 0x00000000.
01:08:28: desc buf flags 0x00000000.
01:08:28: ICMP: echo reply rcvd, src 11.1.1.1, dst 11.1.1.1
01:08:28: ICMP: echo reply sent, src 1.0.0.1, dst 1.0.0.1
01:08:28: Entering c10k_cobalt_send.
01:08:28: Packet decode: datagramstart 0x067D1388 length 116
01:08:28: Header decode: Chan 0, VCCI 5
01:08:28: Header decode: flags 0x0000
01:08:28: c10k_cobalt_send: Checked the idb state.
01:08:28: c10k_cobalt_send: Checked the FromRP Q count.
01:08:28: c10k_cobalt_send: Particle count 0.
01:08:28: Entering cobalt_pak_to_fromrp_ring_inline, scattered FALSE
01:08:28: cobalt_pak_to_fromrp_ring_inline from_rp_tail 15
01:08:28: Entering c10k_cobalt_type0_interrupt, status reg: 0x00000018.
01:08:28: ToRP Dispatched.
01:08:28: Entering cobalt_to_rp_interrupt.
01:08:28: Exiting cobalt_to_rp_interrupt, to_rp_head 31, Packets processed 0
01:08:28: FromRP Dispatched.
01:08:28: Entering cobalt_from_rp_interrupt.
01:08:28: Cleaned descriptor 0x0672FB30.
01:08:28: desc buf ptr 0x00000000.
01:08:28: desc buf len 0x00000000.
01:08:28: desc buf flags 0x00000001.
01:08:28: Entering c10k_cobalt_type0_interrupt, status reg: 0x00000010.
01:08:28: ToRP Dispatched.
01:08:28: Entering cobalt_to_rp_interrupt.
01:08:28: cobalt_to_rp_interrupt: to_rp_head 31
01:08:28: cobalt_to_rp_interrupt: descriptor address 0x0672F930
01:08:28: descriptor buf pointer 0x0672A480
01:08:28: descriptor buf length 114
01:08:28: descriptor buf flags 0x000D
01:08:28: cobalt_to_rp_interrupt, PAK DATA:
01:08:28: 0x00720012 0x180100FF 0x00000F00 0x08004500
```

**debug pxf**

```

01:08:28: 0x0064D02E 0x0000FF01 0xE9680100 0x00010100
01:08:28: 0x00010000 0xCE8A80FF 0x26420000 0x0000003E
01:08:28: 0x1040ABCD 0xABCDABCD 0xABCDABCD 0xABCDABCD
01:08:28:
01:08:28: Entering cobalt_process_to_rp_packet.
01:08:28: Packet decode: datagramstart 0x0672A480
01:08:28: Header decode: length 114, cause 0x0012
01:08:28: Header decode: rsrc_num 3, column 0
01:08:28: Header decode: flags 1
01:08:28: Cobalt packet passed to RP driver!
01:08:28: Exiting cobalt_to_rp_interrupt, to_rp_head 0, Packets processed 1
01:08:28: ICMP: echo reply rcvd, src 1.0.0.1, dst 1.0.0.1
Router#

```

**debug pxf microcode**

The following example shows how to disable the automatic reloading of the microcode on the PXF processors if a fault or crash occurs:

```

Router# debug pxf microcode

PXF microcode debugging is on

Router#

```

If a fault or crash then occurs on the PXF processors, the following messages are displayed on the console to indicate that the automatic reload of the microcode has been disabled and that the microcode must be manually reloaded using the **microcode reload** command.

```

Mar 1 16:29:58.796: %SLICE_TOASTER-4-PXF_CRASHINFO: Writing Slice (PXF) debug information
to slot0:pxf_crashinfo_20020301-212958.
Mar 1 16:30:00.252: NOTE: 'debug pxf microcode' is set. Use 'micro reload pxf' to restart
the PXF

```

**debug pxf stats**

The following example shows how to enable debugging of the statistics collector on the PXF processors, along with some typical debugging messages:

```

Router# debug pxf stats

PXF hardware statistics debugging is on

Router#

00:05:28: read vpn session 1 stat from toaster
00:05:28: read vpn session 2 stat from toaster
00:05:29: Statcoll: read simple stats failed
00:05:29: Statcoll read simple_octet...: NULL params (hwsb=0xFF, tt_info=0xC0)

```

**debug pxf subblocks**

The following example shows how to enable debugging of the subblocks on the PXF processors:

```

Router# debug pxf subblocks

PXF Subblocks debugging is on

Router#

```

| Related Commands | Command                            | Description                                                                                                  |
|------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                  | <b>clear pxf</b>                   | Clears the DMA and error checking and correcting (ECC) error counters on the PXF processor.                  |
|                  | <b>show hardware pxf cable</b>     | Displays information about the multicast echo and packet intercept features for one or all cable interfaces. |
|                  | <b>show hardware pxf cpu</b>       | Displays the display different statistics about the operation of the CPU processor during PXF processing.    |
|                  | <b>show hardware pxf microcode</b> | Displays identifying information for the microcode being used on the processor.                              |
|                  | <b>show hardware pxf xcm</b>       | Displays the current state of ECC for the External Column Memory (XCM) on the PXF processor.                 |

# debug pxf atom

To divert upstream and downstream Layer 2 Virtual Private Network (L2VPN) packets from the hardware switching path to the software switching path on the CMTS routers, use the **debug pxf atom** command in privileged EXEC mode. To cancel this operation, use the **no** form of this command.

```
debug pxf atom {ac | mpls | punt {upstream cable slot/subslot/port sid-value | downstream
label-number}}

no debug pxf atom {ac | mpls | punt {upstream cable slot/subslot/port sid-value | downstream
label-number}}
```

## Syntax Description

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ac</b>                      | Specifies the attachment circuit.                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>mpls</b>                    | Specifies the MPLS forwarding information (MFI).                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>punt</b>                    | Diverts packet from the hardware switching path to the software switching path.                                                                                                                                                                                                                                                                                                                                                           |
| <b>upstream</b>                | Specifies the upstream packets.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>cable slot/subslot/port</b> | Specifies the cable interface for the L2VPN-compliant cable modem, where: <ul style="list-style-type: none"> <li><i>slot</i>—Chassis slot number of the cable interface line card. Valid values are from 5 to 8.</li> <li><i>subslot</i>—Secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li><i>port</i>—Port number. Valid values are from 0 to 4 (depending on the cable interface).</li> </ul> |
| <i>sid-value</i>               | Service ID (SID) of the cable modem.                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>downstream label-number</b> | Specifies the local Multiprotocol Label Switching (MPLS) label of the pseudowire on the CMTS for downstream packets.                                                                                                                                                                                                                                                                                                                      |

## Command Default

None

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                  |
|-------------|---------------------------------------------------------------|
| 12.2(33)SCC | This command was introduced in Cisco IOS Release 12.2(33)SCC. |

## Usage Guidelines

This debug command enables the Parallel eXpress Forwarding (PXF) function to divert the upstream L2VPN packets from the hardware switching path to the software switching path, if the upstream packets match with the specified cable interface and SID. This debug command also enables the PXF function to divert the downstream L2VPN packets from the hardware switching path to the software switching path, if the downstream packets match with the specified local MPLS pseudowire label.

The **debug pxf atom** command must be used in conjunction with the **debug cable mac-address** and **debug cable l2-vpn** commands.

| Related Commands | Command                        | Description                                                                                                                                      |
|------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>debug cable mac-address</b> | Enables debugging output for a specific cable modem.                                                                                             |
|                  | <b>debug cable l2-vpn</b>      | Enables debugging output for the Layer 2 mapping of cable modems to a permanent virtual connection (PVC) or a virtual local area network (VLAN). |

# debug redundancy

To enable debugging of the Route Processor Redundancy (RPR) feature and its background procedures, use the **debug redundancy** command in Privileged EXEC mode.

**debug redundancy** {alarms | all | configsync | fsm | keepalive | peer-monitor | services | timesync}

## Syntax Description

|                     |                                                                                                               |
|---------------------|---------------------------------------------------------------------------------------------------------------|
| <b>alarms</b>       | Enables debugging messages for alarms sent because of redundancy procedures.                                  |
| <b>all</b>          | Enables all redundancy debugging messages.                                                                    |
| <b>configsync</b>   | Enables debugging messages for the synchronization of the configuration files.                                |
| <b>fsm</b>          | Enables debugging for changes in the redundancy finite state machine (FSM).                                   |
| <b>keepalive</b>    | Enables debugging messages for the keepalive messages sent between Performance Routing Engine (PRE1) modules. |
| <b>peer-monitor</b> | Enables debugging messages for the standby PRE1 module's monitoring of the active PRE1 module.                |
| <b>rf-fsm</b>       | Enables debugging for changes in the redundancy finite state machine (FSM).                                   |
| <b>services</b>     | Enables debugging for the services requested during redundancy processing.                                    |
| <b>timesync</b>     | Enables debugging messages for time synchronization procedures.                                               |

## Command Modes

Privileged EXEC

## Command History

| Release     | Modification                                               |
|-------------|------------------------------------------------------------|
| 12.2(4)XF1  | This command was introduced for the Cisco uBR10012 router. |
| 12.2(11)BC3 | The <b>fsm</b> option was renamed to <b>rf-fsm</b> .       |

## Examples

The following example shows all redundancy debugging messages being enabled:

```
Router# debug redundancy all
```

```
Redundancy All debugging is on
```

```
Router#
```

The following example shows typical messages that the **debug redundancy alarms** command displays:

```
Router# debug redundancy alarms
```

```
Redundancy Alarms debugging is on
```

```
Router#
```

```
01:28:48: %REDUNDANCY-5-PEER_MONITOR_EVENT: Primary detected a secondary crash
(raw-event=KEEPALIVE_FAILURE(7))
slave_down: generating Secondary-Down alarm
Asserting alarm : SEC_FAILURE

01:28:48: %REDUNDANCY-5-PEER_MONITOR_EVENT: Primary detected a secondary crash
(raw-event=PEER_REDUNDANCY_STATE_CHANGE(5))
```

The following example shows the typical state changes that the **debug redundancy fsm** command displays when the standby PRE1 module is reset:

```
Router# debug redundancy fsm

Redundancy FSM debugging is on
Router#

01:15:30: %REDUNDANCY-5-PEER_MONITOR_EVENT: Primary detected a secondary crash
(raw-event=KEEPALIVE_FAILURE(7))
Flushing IPC entries in FSM queue

01:15:30: ehfa_fsm: state change, events: major=2 minor=1
REDUNDANCY_PEERSECONDARY_INITED(9) => REDUNDANCY_PEERSECONDARY_NONOPERATIONAL(6)

01:15:31: %REDUNDANCY-5-PEER_MONITOR_EVENT: Primary detected a secondary crash
(raw-event=PEER_REDUNDANCY_STATE_CHANGE(5))

01:15:31: %REDUNDANCY-5-PEER_MONITOR_EVENT: Primary detected a secondary crash
(raw-event=KEEPALIVE_FAILURE(7))
Flushing IPC entries in FSM queue

01:15:31: ehfa_fsm: state change, events: major=2 minor=1
REDUNDANCY_PEERSECONDARY_INITED(9) => REDUNDANCY_PEERSECONDARY_NONOPERATIONAL(6)

01:15:31: %REDUNDANCY-5-PEER_MONITOR_EVENT: Primary detected a secondary crash
(raw-event=PEER_REDUNDANCY_STATE_CHANGE(5))
```

The following example shows the messages that are displayed by the **debug redundancy keepalive** command:

```
Router# debug red keepalive

Redundancy Keepalive debugging is on
Router#

Sent keepalive
Received keepalive
Sent keepalive
Received keepalive
Sent keepalive
Received keepalive
Sent keepalive
```

## Related Commands

| Command          | Description                                                                                  |
|------------------|----------------------------------------------------------------------------------------------|
| <b>associate</b> | Associates two line cards for APS redundancy protection.                                     |
| <b>auto-sync</b> | Configures what system files the primary and standby PRE1 modules automatically synchronize. |
| <b>main-cpu</b>  | Enters main CPU redundancy configuration mode.                                               |

| Command                                           | Description                                                                         |
|---------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>redundancy</b>                                 | Enters redundancy configuration mode.                                               |
| <b>redundancy<br/>force-failover<br/>main-cpu</b> | Forces a switchover so that the standby PRE1 module becomes the active PRE1 module. |



# debug usb

To display the packets that are transmitted and received over the USB interface, use the **debug usb** command in privileged EXEC mode. To turn off debugging for the USB interface, use the **no** form of this command.

**Cisco uBR925 cable access router, Cisco CVA122 Cable Voice Adapter**

**debug usb {rx | tx}**

**no debug usb {rx | tx}**

## Syntax Description

|           |                                                    |
|-----------|----------------------------------------------------|
| <b>rx</b> | Displays packets received on the USB interface.    |
| <b>tx</b> | Displays packets transmitted on the USB interface. |

## Command Modes

Privileged EXEC

## Command History

| Release   | Modification                                                          |
|-----------|-----------------------------------------------------------------------|
| 12.1(5)XU | This command was introduced for the Cisco CVA122 Cable Voice Adapter. |
| 12.2(2)XA | Support was added for the Cisco uBR925 cable access router.           |

## Usage Guidelines

This command displays a hexadecimal dump of each packet transmitted or received on the USB interface and should be used only while debugging CM operation. Displaying debugging messages, especially for each packet transmitted or received, consumes system resources. Turning on too many messages could negatively affect system performance.

## Examples

The following shows typical output from the **debug usb** command.

```
Router# debug usb rx
USB Rx debugging is on
Router# debug usb tx
USB Tx debugging is on
Nov 22 11:01:36.909: 0x040: 72 6C 19 E7 0C 12
Nov 22 11:12:18.447: USB transmit packet data (size=114):
Nov 22 11:12:18.447: 0x000: 00 01 64 FF E1 13 00 01 64 FF E1 12 08 00 45 00
Nov 22 11:12:18.447: 0x010: 00 64 16 32 00 00 FF 01 62 FF 20 01 01 01 20 01
Nov 22 11:12:18.451: 0x020: 01 65 08 00 40 5D 1E 3D 07 2D 00 00 00 00 04 19
Nov 22 11:12:18.451: 0x052: AB CD AB CD AB CD AB CD AB CD AB CD AB CD
Nov 22 11:12:18.455: 0x060: AB CD AB CD AB CD AB CD AB CD AB CD AB CD AB CD
Nov 22 11:12:18.455: 0x070: AB CD
Nov 22 11:12:18.459: USB receive packet data (size=60):
Nov 22 11:12:18.459: 0x000: FF FF FF FF FF FF 00 01 64 FF E1 13 08 06 00 01
Nov 22 11:12:18.463: 0x010: 08 00 06 04 00 01 00 01 64 FF E1 13
Nov 22 11:12:18.463: 0x01C: 20 01 01 65
Nov 22 11:12:18.463: 0x020: 00 00 00 00 00 00 20 01 01 01 00 00 00 00 00 00
Nov 22 11:12:18.467: 0x030: 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Nov 22 11:12:18.467: USB transmit packet data (size=60):
```

## ■ debug usb

```

Nov 22 11:12:18.471: 0x000: 00 01 64 FF E1 13 00 01 64 FF E1 12 08 06 00 01
Nov 22 11:12:18.471: 0x010: 08 00 06 04 00 02 00 01 64 FF E1 12
Nov 22 11:12:18.471: 0x01C: 20 01 01 01
Nov 22 11:12:18.471: 0x020: 00 01 64 FF E1 13 20 01 01 65 00 00 00 00 00
Nov 22 11:12:18.475: 0x030: 00 00 00 00 00 00 00 00 00 00 00 00
Nov 22 11:12:18.479: USB receive packet data (size=114):
Nov 22 11:12:18.479: 0x000: 00 01 64 FF E1 12 00 01 64 FF E1 13 08 00 45 00
Nov 22 11:12:18.483: 0x010: 00 64 20 25 00 00 80 01 D8 0C 20 01 01 65 20 01
Nov 22 11:12:18.483: 0x020: 01 01 00 00 48 5D 1E 3D 07 2D 00 00 00 00 04 19
Nov 22 11:12:18.487: 0x052: AB CD AB CD AB CD AB CD AB CD AB CD AB CD
Nov 22 11:12:18.487: 0x060: AB CD AB CD AB CD AB CD AB CD AB CD AB CD
Nov 22 11:12:18.487: 0x070: AB CD
Nov 22 11:12:18.491: USB transmit packet data (size=114):
Nov 22 11:12:18.491: 0x000: 00 01 64 FF E1 13 00 01 64 FF E1 12 08 00 45 00
Nov 22 11:12:18.495: 0x010: 00 64 16 33 00 00 FF 01 62 FE 20 01 01 01 20 01
Nov 22 11:12:18.495: 0x020: 01 65 08 00 40 30 1E 3E 07 2D 00 00 00 00 04 19
Nov 22 11:12:18.499: 0x052: AB CD AB CD AB CD AB CD AB CD AB CD AB CD
Nov 22 11:12:18.499: 0x060: AB CD AB CD AB CD AB CD AB CD AB CD AB CD
Nov 22 11:12:18.499: 0x070: AB CD

```

**Related Commands**

| Command                             | Description                                                                  |
|-------------------------------------|------------------------------------------------------------------------------|
| <b>debug cable-modem bpk</b>        | Displays information about Baseline Privacy Interface (BPI) key management.  |
| <b>debug cable-modem bridge</b>     | Displays bridge filter processing information.                               |
| <b>debug cable-modem error</b>      | Displays debugging messages for the cable interface driver.                  |
| <b>debug cable-modem interrupts</b> | Displays information about cable interface interrupts.                       |
| <b>debug cable-modem mac log</b>    | Displays comprehensive debugging messages for the cable interface MAC layer. |



## Appendix B: CMTS Router ROM Monitor Commands

---

**Revised: August 12, 2013, OL-15510-17**

This appendix describes the ROM monitor (ROMMON) that is used by the Cisco CMTS routers. The Cisco CMTS runs the ROM monitor when it is initially powered on or reset, and the ROM monitor determines what other software, such as a Cisco IOS boot helper image or software image, should be loaded next.

Because the ROM monitor is in the permanent memory on the processor card, it is always available and can help in troubleshooting possible hardware or software problems. It contains a small set of commands that allow access to the router's internal memory and other memory devices.

This appendix contains the following major sections:

- [Entering the ROM Monitor, page 2549](#)
- [Command Conventions, page 2552](#)
- [ROM Monitor Commands, page 2552](#)



**Caution**

The ROM monitor should be used only by trained service technicians or under the direction of a Cisco TAC engineer. Many of the commands available in the ROM monitor put the router in a diagnostic mode or in a non-functional state. Do not enter any commands in the ROM monitor unless you thoroughly understand their function and how to reverse their effects so that you can restore the router to normal operations.

---

## Entering the ROM Monitor

When the router initially powers on or reboots, the ROM monitor initializes the processor hardware and boots the main Cisco IOS software. You can enter ROM monitor mode during the bootup sequence or while the Cisco IOS software is running by using either the BREAK signal or by using the configuration register. See the following sections for more information on each method.

## Using the BREAK Signal

When the Cisco CMTS router is booting up, you can interrupt the start-up sequence and enter the ROM monitor by sending the BREAK signal. If the Cisco IOS software image is already running, you can also break into the ROM monitor by sending the BREAK signal. (Consult the documentation for your terminal software for information on how to send the BREAK signal).

For example, the following shows the BREAK signal being sent to interrupt a router that is running Cisco IOS software so as to enter ROM monitor mode.



**Tip** In this example, a CTRL-] is used to enter Telnet command mode, where the **send brk** command is used to send the BREAK signal. Other terminal programs might use different commands.

```
Router# show version
```

```
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (UBR7200-P-M), Version 12.2(15)BC1, RELEASE SOFTWARE
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2003 by cisco Systems, Inc.
```

```
...
```

```
16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2102
```

```
Router# ^] <-- in this example, a CTRL-] is used to enter telnet command mode
```

```
telnet> send brk
```

```
*** System received an abort due to Break Key ***
signal= 0x3, code= 0x0, context= 0x6208b290
PC = 0x606b5ab0, SP = 0x80007e00, RA = 0x606d2370
Cause Reg = 0xffffffff, Status Reg = 0x3400ff03
```

```
rommon 1 >
```



### Caution

When you enter ROM monitor mode, the Cisco IOS software no longer is executing, and all of the router's normal functions end. Do not enter ROM monitor mode on a Cisco CMTS that is being used for production purposes because this immediately halts all network and subscriber traffic through that Cisco CMTS until you restart the Cisco IOS software.



### Tip

To resume execution after interrupting the boot process or Cisco IOS software, use the **cont** command at the ROM monitor prompt. To boot another software image, use the **boot** command at the ROM monitor prompt.

## Using the Configuration Register

When the router initially boots, it passes control to the ROM monitor software, which uses the value of the configuration register to determine the next step in the bootup process. You can change the value of the configuration register by using the **confreg** command in ROM monitor mode or by using the **config-reg** command in global configuration mode.

### Using the Configuration Register in Global Configuration Mode

To set the configuration register when the router is running the Cisco IOS software, use the **config-reg** command in global configuration mode. Then use the **reload** command to reboot the router.

For example, the following commands set the configuration register to 0x00 so that the router boots into ROM monitor mode. The **reload** command then reboots the router.

```
Router# configure terminal
Router(config)# config-reg 0x0
Router(config)# exit
Router# reload

(router reboots)

System Bootstrap, Version 12.2(11)BC3a, RELEASE SOFTWARE (fc1)
Copyright (c) 2002 by cisco Systems, Inc.
UBR7200 platform with 524288 Kbytes of main memory

rommon 1 >
```



Tip

To set the configuration register for normal operations, use the **config-reg 0x2102** command. For a complete description of the configuration register, see the description of the **confreg** command.

### Using the Configuration Register in ROM Monitor Mode

To set the configuration register when the router is in ROM monitor mode, use the **confreg** command in ROM monitor mode. For example, the following commands set the configuration register to 0x2102, so that the router boots the Cisco IOS software. The **reset** command then reboots the router.

```
rommon 21 > confreg 0x2102

You must reset or power cycle for new config to take effect

rommon 22 > reset

System Bootstrap, Version 12.2(11)BC3a, RELEASE SOFTWARE (fc1)
Copyright (c) 2002 by cisco Systems, Inc.
UBR7200 platform with 524288 Kbytes of main memory

Self decompressing the image:
#####
[OK]

(Software image boots...)

Router>
```

**Tip**

To set the configuration register for normal operations, use the **confreg 0x0** command. For a complete description of the configuration register, see the description of the **confreg** command.

## Command Conventions

Use the following conventions when giving commands at the ROM monitor prompt:

- Brackets [ ] denote an optional field.
- A word in *italics* is a variable for which you must supply a valid value.
- The default ROM monitor prompt is “rommon *x* >”, where *x* is the number of the command, as used in the command history table. The ROM monitor prompt is determined by the PS1 environment variable (see the **set** command).
- Give the **help** or **?** command to display a help screen listing all of the commands that are available in ROM monitor mode. For usage information about a specific command, give the command followed by **-?** (for example, **alias -?**).
- All address and size arguments to the memory-related commands are hexadecimal values (using a “0x” prefix).
- To specify more than one command on a command line, separate the commands with the semicolon (;) delimiter.

**Note**

You cannot include the **repeat** command as part of a command line that has multiple commands.

## ROM Monitor Commands

You can use the following commands at the ROM monitor prompt on a Cisco CMTS router:

- [alias, page 2554](#)
- [boot, page 2556](#)
- [break, page 2560](#)
- [confreg, page 2562](#)
- [cont, page 2565](#)
- [context, page 2567](#)
- [cpu\\_card\\_type, page 2569](#)
- [dev, page 2570](#)
- [dir, page 2572](#)
- [dis, page 2573](#)
- [frame, page 2575](#)
- [help, page 2577](#)
- [history, page 2579](#)

- [meminfo](#), page 2581
- [repeat](#), page 2582
- [reset](#), page 2584
- [set](#), page 2586
- [show\\_spd](#), page 2588
- [stack](#), page 2591
- [sync](#), page 2593
- [sysreset](#), page 2595
- [unalias](#), page 2597
- [unset](#), page 2599

# alias

To define an alias to be used at the ROM monitor prompt, use the **alias** command in ROM monitor mode.

**alias** [*name=value*]

## Syntax Description

|                   |                                                                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>name=value</i> | (Optional) Specifies the name of the alias to be defined and its corresponding command string. If the <i>value</i> parameter includes spaces, you must include the string within double quotes. |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

If no arguments are given, displays the aliases that are currently defined.

## Command Modes

ROM monitor (>)

## Command History

| Release     | Modification                                                                                                                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
| 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

## Usage Guidelines

Aliasing allows you to abbreviate commands or to set up a command so that it is automatically run with certain options. The ROM monitor's **alias** function is based on the syntax used in the Korn shell on Unix systems.

Normally, only the first word at the ROM monitor prompt is checked for an alias. However, when you define an alias that contains a space as its last character, the ROM monitor also checks the next word at the ROM monitor prompt for an alias.



### Note

If an alias contains any spaces, the entire command must be enclosed within quotes when you define it with the **alias** command. To create an alias for multiple commands, separate the commands with a semicolon (;) delimiter.



### Tip

Use the **unalias** command to delete an alias.



---

**Examples**

The following example shows how to display the currently defined aliases:

```
rommon 13 > alias
```

```
r=repeat
h=history
?=help
b=boot
ls=dir
i=reset
k=stack
```

```
rommon 14 >
```

The following example defines an alias named “cpuinfo” that executes three separate CPU-related commands:

```
rommon 31 > alias cpuinfo="cpu_card_type;meminfo;context"
rommon 32 >
```

The following example shows how to define an alias **dird** that lists the file contents of the Flash Disk in the disk0 slot:

```
rommon 18 > alias dird="dir disk0:"
rommon 19 > alias
```

```
r=repeat
h=history
?=help
b=boot
ls=dir
i=reset
k=stack
dird=dir disk0:
```

```
rommon 20 >
```

---

**Related Commands**

| Command        | Description                                                                             |
|----------------|-----------------------------------------------------------------------------------------|
| <b>sync</b>    | Writes the current values of aliases and monitor environment variables to Flash memory. |
| <b>unalias</b> | Deletes a currently-defined alias.                                                      |

# boot

To boot a router manually, use the **boot** command in ROM monitor mode.

```
boot [-xv]

boot [-xv] [device:][imagename]

boot [-xv] filename [tftp-ip-address]

boot [-xv] tftp://server/path/filename
```

## Syntax Description

|                                    |                                                                                                                                                                                                                                                                                       |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>x</b>                           | (Optional) Loads the specified image into the router’s memory but does not execute it.                                                                                                                                                                                                |
| <b>v</b>                           | (Optional) Enables verbose mode to display debugging information as the image is loaded and executed.                                                                                                                                                                                 |
| <i>device:</i>                     | (Optional) Specifies that the router should boot an image on the specified device. If not specified, the router boots from the default memory device.                                                                                                                                 |
| <i>imagename</i>                   | (Optional) Specifies the filename for the image to be booted and loaded. If not specified, the router boots the first file on the specified device.<br><br><b>Note</b> When specifying both a <i>device:</i> and <i>imagename</i> , do not put any spaces between the two arguments.  |
| <i>filename</i>                    | Specifies the path and filename for the image that the router should download from a Trivial File Transfer Protocol (TFTP) server.<br><br><b>Note</b> You must specify the full path for the desired file, as it exists on the TFTP server.                                           |
| <i>tftp-ip-address</i>             | (Optional) Specifies the IP address for the TFTP server from which the router should download and boot the specified <i>filename</i> . If not specified, the router sends a TFTP request to the IP broadcast address of 255.255.255.255 and uses the first TFTP server that responds. |
| <i>tftp://server/path/filename</i> | Specifies the complete TFTP URL for the filename to be downloaded and run. This URL should specify the fully-qualified <i>server</i> name (or IP address), full <i>path</i> on the TFTP server, and <i>filename</i> to be downloaded.                                                 |

## Defaults

If specified without any options, the **boot** command loads and executes the first file on the default memory device. If a *device* is specified without a *filename*, the **boot** command loads and executes the first file on that device. If a *filename* is specified without a TFTP server IP address, the boot command advertises for a TFTP server using the IP broadcast address of 255.255.255.255 and uses the first TFTP server that responds.

## Command Modes

ROM monitor (>)

## Command History

| Release   | Modification                                                 |
|-----------|--------------------------------------------------------------|
| 11.3 NA   | This command was introduced on Cisco uBR7200 series routers. |
| 12.1(5)EC | Support was added for Cisco uBR7100 series routers.          |

| Release     | Modification                                                                                                                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

### Usage Guidelines

The **boot** command allows a network administrator to boot the router from the ROM monitor (ROMMON) prompt. The router can enter ROMMON for the following reasons:

- The administrator interrupted the boot sequence or Cisco IOS software by pressing the BREAK signal.
- The router's configuration register is set to boot into ROMMON (0x00).
- The router entered ROMMON because of a software exception or error.

The **boot** command allows the administrator to continue the boot process or to load a new software image.



#### Note

To upgrade the router to a new Cisco IOS software image, you can use either the **boot** command in ROMMON mode or the **boot system** commands in global configuration mode.

### Boot Changes in Cisco IOS Release 12.2

Cisco IOS Release 12.2 changed the behavior of the ROM monitor (ROMMON) during the bootup sequence. Previously, users could issue the break signal during the bootup sequence to break into ROMMON, and then immediately boot a new Cisco IOS image using the **boot** command.

This behavior is no longer allowed when the router is using a boot image that is based on Cisco IOS Release 12.2, because interrupting the boot process could leave the hardware and software registers in an unknown state. Instead, use the following procedure when using a router with a Cisco IOS Release 12.2 boot image:

- Step 1** At the router's console prompt, send a BREAK signal to interrupt the boot process and enter ROMMON.
- Step 2** Set the configure register to boot into ROMMON by giving the **confreg 0x0** command.
- Step 3** Use the **reset** command to reset the NPE and to boot into ROMMON. This ensures a clean boot into ROMMON, with all registers set to a known state.
- Step 4** Set the configure register to boot an IOS image by giving the **confreg 0x2102** command.
- Step 5** Use the **boot** command to boot the desired Cisco IOS image.

### Examples

The following example shows how to boot the router using the first file in the default device:

```
rommon 1 > boot
```

```
Self decompressing the image :
```

```
#####
[OK]
```

```
(Software image boots...)
```

```
Router>
```

The following example shows how to specify that the router should download and boot the file named “newimage.bin” in the subdirectory named “ubrimages” on the TFTP server with the IP address of 10.10.10.31:

```
rommon 45> boot tftp://10.10.10.31/ubrimages/newimage.bin
```

```
Self decompressing the image :
```

```
#####
[OK]
```

```
(Software image boots...)
```

```
Router>
```

The following example shows how to use the alternate syntax to specify that the router should download and boot the file named newimage.bin on the TFTP server with the IP address of 10.10.10.31:

```
rommon 45> boot newimage.bin 10.10.10.31
```

```
Self decompressing the image :
```

```
#####
[OK]
```

```
(Software image boots...)
```

```
Router>
```

The following example shows the new ROMMON boot procedure that is required when using a Cisco IOS Release 12.2 (or later) boot image:

```
Router-NPE#
```

```
telnet> send brk
```

```
*** System received an abort due to Break Key ***
signal= 0x3, code= 0x0, context= 0x6208b290
PC = 0x606b5ab0, SP = 0x80007e00, RA = 0x606d2370
Cause Reg = 0xffffffff, Status Reg = 0x3400ff03
```

```
rommon 2 > boot flash:newiosimage.bin
```

```
Please reset before booting
```

```
rommon 3 > confreg 0x0
```

```
You must reset or power cycle for new config to take effect
```

```
rommon 4 > reset
```

```
System Bootstrap, Version 12.2(11)BC3a, RELEASE SOFTWARE (fc1)
Copyright (c) 2002 by cisco Systems, Inc.
UBR7200 platform with 524288 Kbytes of main memory
```

```
rommon 1 > boot flash:newiosimage.bin
```

```
Self decompressing the image :
```

```
#####
[OK]
```

```
(Software image boots...)
```

```
Router>
```

**Related Commands**

| Command         | Description                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------------------|
| <b>break</b>    | Sets or clears the debugger breakpoint.                                                                           |
| <b>cont</b>     | Continues the execution of the Cisco IOS software image that has been interrupted by a BREAK or debugger command. |
| <b>reset</b>    | Reinitializes the ROM monitor and return it to a known state.                                                     |
| <b>sync</b>     | Writes the current values of aliases and monitor environment variables to Flash memory.                           |
| <b>sysreset</b> | Displays the return information from the system image that was last booted.                                       |

# break

To set or clear the debugger breakpoint, use the **break** command in ROM monitor mode.

**break** [-s *address* | -c]

|                           |                          |                                                                                                                                |
|---------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>-s <i>address</i></b> | (Optional) Sets the breakpoint to the specified <i>address</i> in memory. The <i>address</i> must be specified in hexadecimal. |
|                           | <b>-c</b>                | (Optional) Clears the currently-defined breakpoint.                                                                            |

**Defaults** If no arguments are given, the command displays the currently-defined breakpoint.

**Command Modes** ROM monitor

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                            |
|------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 11.3 NA        | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                        | 12.1(5)EC      | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                        | 12.2(4)BC1     | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Usage Guidelines** The ROM monitor supports one breakpoint. If set, the processor runs normally, but when its program counter reaches the breakpoint address, the system breaks into ROM monitor mode. You can examine memory locations or register contents, and then continue normal program execution by using the **cont** command.

**Examples** The following example shows how to set a breakpoint so that when the processor breaks into ROM monitor mode when its program counter reaches 0xbfc02708:

```
rommon 37 > break -s 0xbfc02708
```

```
breakpoint set to 0xbfc02708
```

```
rommon 38 >
```

The following example shows how to display the currently-defined breakpoint:

```
rommon 38 > break
```

```
breakpoint set to 0xbfc02708
```

```
rommon 39 >
```

The following example shows how to clear the currently-defined breakpoint:

```
rommon 39 > break -c

breakpoint is cleared

rommon 40 >
```

#### Related Commands

| Command     | Description                                                                                                          |
|-------------|----------------------------------------------------------------------------------------------------------------------|
| <b>boot</b> | Boots the router manually.                                                                                           |
| <b>cont</b> | Continues the execution of the Cisco IOS software image that has been interrupted by a BREAK or debugger breakpoint. |

# confreg

To change the value of the router's configuration register, use the **confreg** command in ROM monitor mode.

**confreg** [*value*]

## Syntax Description

|              |                                                                                                                                                                                                                                                                |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>value</i> | (Optional) New value for the configuration register, expressed as a 16-bit hexadecimal value. The valid range for <i>value</i> is 0x0 to 0xFFFF. If <i>value</i> is not specified, the command interactively prompts you for the individual register settings. |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

0x2102 (boots the Cisco IOS software image and allows the use of the BREAK signal to enter ROMMON)

## Command Modes

ROM monitor (>)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                       |
| 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                |
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router.                                                                   |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The configuration register determines the router's behavior when it boots. Typically, an administrator changes the configuration register so that it boots either into ROMMON mode or boots a Cisco IOS software image, but other options are also available.

If given without an argument, the **confreg** command interactively prompts you for the new values of the individual register settings, using English descriptions. You can either keep the current settings unchanged or change them as desired. The new value of the configuration register is written into the router's nonvolatile Flash memory (NVRAM) immediately, but does not take effect until you reset the router.

If you specify an argument with the **confreg** command, it must be a 16-bit hexadecimal value in the following format:

**Table 275 Configuration Register Bit Field Descriptions**

| Bit | Description                                                             |
|-----|-------------------------------------------------------------------------|
| 15  | If set, enables the router's diagnostic mode (for example, 0x8000).     |
| 14  | If set, uses the network number in IP broadcasts (for example, 0x4000). |



**Table 275** Configuration Register Bit Field Descriptions (continued)

| Bit   | Description                                                                                                                                                                                                                                                                                                                                                           |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13    | If set, allows the router to fall back into ROMMON mode if the boot procedure fails. If not set, the router attempts each valid <b>boot</b> command (as specified by bits 3–0) for a total of 5 times each, until one of the commands is successful (for example, 0x2000).                                                                                            |
| 12–11 | Defines the speed, in bps, for the console port:<br>00 = 0x0000 = 9600<br>01 = 0x0800 = 4800<br>10 = 0x1000 = 1200<br>11 = 0x1800 = 2400<br><b>Note</b> On the Cisco CMTS routers, the console port speed is fixed at 9600 bps and cannot be changed.                                                                                                                 |
| 10    | If set, uses an IP broadcast address that consists of all ones (for example, 0x0400).                                                                                                                                                                                                                                                                                 |
| 9     | If set, disables the secondary bootstrap (for example, 0x0200).                                                                                                                                                                                                                                                                                                       |
| 8     | If set, the router enables the BREAK key, allowing users to break into ROMMON during the boot process (for example, 0x0100).                                                                                                                                                                                                                                          |
| 7     | Unused on the Cisco CMTS routers.                                                                                                                                                                                                                                                                                                                                     |
| 6     | If set, the router ignores the configuration file in its Flash memory. This is typically done when the user has forgotten the router's enable password (for example, 0x0040).                                                                                                                                                                                         |
| 5–4   | Unused on the Cisco CMTS routers.                                                                                                                                                                                                                                                                                                                                     |
| 3–0   | Defines the router's boot behavior:<br>0x0000 = Boots to the ROMMON prompt<br>0x0001 = Boots the ROMMON boot helper software (first file in bootflash:)<br>0x0002 to 0x000F = Boots a Cisco IOS software image, based on the values of the router's boot variables. Each <b>boot system</b> command in the configuration file is tried until a valid image is booted. |

For example, for normal operations the configuration register is set to 0x2102, which sets bit 13 (allows the router to fall into ROMMON mode if the boot fails), bit 8 (allows the user to break into ROMMON), and bit 1 (boots a Cisco IOS software image). Bits 11 and 12 are cleared, which sets the console port to 9600 bps.

The following are the most commonly-used configuration register values:

- 0x0 = Boot into ROMMON.
- 0x2002 = Normal boot for standard operations, but the BREAK signal cannot be used to break into ROM monitor mode.
- 0x2102 = Normal boot for standard operations, enabling the BREAK signal.
- 0x2142 = Normal boot but the router ignores the configuration file in Flash memory.

**Tip**

The **confreg** command is identical in function to the **config-register** command that is available in global configuration mode.

Examples

The following example shows how to change the configuration register by using the English prompts. In this example, the only change is to have the router boot the Cisco IOS software image instead of entering ROMMON mode:

```
rommon 1 > confreg

Configuration Summary
enabled are:
break/abort has effect
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n [n]: y
enable "diagnostic mode"? y/n [n]:
enable "use net in IP bcast address"? y/n [n]:
enable "load rom after netboot fails"? y/n [n]:
enable "use all zero broadcast"? y/n [n]:
disable "break/abort has effect"? y/n [n]:
enable "ignore system config info"? y/n [n]:
change console baud rate? y/n [n]:
change the boot characteristics? y/n [n]: y
enter to boot:
0 = ROM Monitor
1 = the boot helper image
2-15 = boot system
[0]: 2

Configuration Summary
enabled are:
break/abort has effect
console baud: 9600
boot: image specified by the boot system commands
 or default to: cisco2-C10000

do you wish to change the configuration? y/n [n]: n

You must reset or power cycle for new config to take effect.

rommon 2 >
```



Note

After changing the configuration register in interactive mode, the system displays the new values and prompts you again as to whether you want to change them. If the values are correct, answer **no** and the system returns you to the ROMMON prompt. If you made any changes, the system reminds you that you must reset or power cycle the router before the new configuration register takes effect.

The following example shows how to set the configuration register to the typical value of 0x2102, so that it boots a Cisco IOS software image:

```
rommon 7 > confreg 0x2102

You must reset or power cycle for new config to take effect.

rommon 8 >
```

Related Commands

| Command     | Description                |
|-------------|----------------------------|
| <b>boot</b> | Boots the router manually. |

# cont

To continue the execution of the Cisco IOS software image that has been interrupted by a BREAK signal or debugger breakpoint, use the **cont** command in ROM monitor mode.

**cont** [*address*]

## Syntax Description

*address* (Optional) Specifies the address in memory at which the router should continue execution. If *address* is not specified, the command continues execution at the address currently stored in the program counter (PC) register.



### Caution

Do not use the *address* option unless instructed to do so by Cisco TAC engineers.

## Command Default

If given without any arguments, the command continues execution at the address currently stored in the processor's program counter (PC) register.

## Command Modes

ROM monitor (>)

## Command History

| Release     | Modification                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                       |
| 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                |
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router.                                                                   |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                         |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. |

## Usage Guidelines

The **cont** command typically is used when a user has interrupted the operation of the Cisco IOS software by using the BREAK signal to enter ROM monitor mode, and then wants to continue with the original Cisco IOS software image. This command can also be used to continue program execution when the user uses the BREAK signal to interrupt the Cisco IOS software boot procedure, or has used the **break** command to set a debug breakpoint.

## Examples

In the following example, the **cont** command continues executing the Cisco IOS software image, after the user has interrupted the software by sending a BREAK signal:

```
Router#
```

```
telnet> send brk
```

```
*** System received an abort due to Break Key ***
signal= 0x3, code= 0x0, context= 0x6208b290
```

 cont

```
PC = 0x606b5ab0, SP = 0x80007e00, RA = 0x606d2370
Cause Reg = 0xffffffff, Status Reg = 0x3400ff03
```

```
rommon 5 > cont
```

```
Router#
```

**Related Commands**

| Command         | Description                                                                 |
|-----------------|-----------------------------------------------------------------------------|
| <b>boot</b>     | Boots the router manually.                                                  |
| <b>break</b>    | Sets or clears the debugger breakpoint.                                     |
| <b>reset</b>    | Reinitializes the ROM monitor and return it to a known state.               |
| <b>sysreset</b> | Displays the return information from the system image that was last booted. |

# context

To display the processor context at the time of the most recent fault or exception, use the **context** command in ROM monitor mode.

## context

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values.

**Command Modes** ROM monitor (>)

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Usage Guidelines** When the processor fault or exception occurs, the ROM monitor preserves the processor context at the time of the fault. The **context** command displays this processor context, which includes information about the kernel registers and the process mode of the booted image (if available).

**Examples** The following example shows how to display the CPU context at the time of the most recent fault or exception:

```
rommon 21 > context
```

```
Kernel Level Context:
```

| Reg   | MSW        | LSW       | Reg   | MSW        | LSW      |
|-------|------------|-----------|-------|------------|----------|
| ----- | -----      | -----     | ----- | -----      | -----    |
| zero  | : 00000000 | 00000000  | s0    | : ffffffff | 80018a90 |
| AT    | : 00000000 | 00000050  | s1    | : 00000000 | 00000002 |
| v0    | : ffffffff | fffffffcc | s2    | : 00000000 | 00000006 |
| v1    | : 00000000 | 02000000  | s3    | : ffffffff | 80007798 |
| a0    | : ffffffff | 80018a90  | s4    | : 00000000 | 00000002 |
| a1    | : 00000000 | 00000002  | s5    | : 00000000 | 000000ec |
| a2    | : ffffffff | 80007798  | s6    | : 00000000 | 00000002 |
| a3    | : 00000000 | 00000002  | s7    | : 00000000 | 00000000 |
| t0    | : ffffffff | ba000004  | t8    | : ffffffff | 800268b0 |

**context**

```
t1 : 00000000 00000002 | t9 : 00000000 00000000
t2 : 00000000 00000000 | k0 : 00000000 3040f001
t3 : 00000000 00000020 | k1 : ffffffff be800014
t4 : 00000000 20642e31 | gp : 00000000 60336f00
t5 : 00000000 30306153 | sp : ffffffff 80007728
t6 : 00000000 446e7369 | s8 : 00000000 00000002
t7 : 00000000 206b4453 | ra : ffffffff 80010570
HI : 00000000 00000004 | LO : 00000000 00007a2a
EPC : ffffffff 80010250 | ErrPC : ffffffff bfc00c54
Stat : 3040f003 | Cause : 00008000
```

context: process context is not valid

rommon 22 >

**Related Commands**

| Command         | Description                                                                 |
|-----------------|-----------------------------------------------------------------------------|
| <b>boot</b>     | Boots the router manually.                                                  |
| <b>sysreset</b> | Displays the return information from the system image that was last booted. |

# cpu\_card\_type

To display the type of processor card that is installed in the router, use the **cpu\_card\_type** command in ROM monitor mode.

## cpu\_card\_type

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values.

**Command Modes** ROM monitor (>)

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Examples** The following example shows that the router is using an NPE-225 processor card:

```
rommon 92 > cpu_card_type
```

```
CPU card type is NPE-225
```

```
rommon 93 >
```

| Related Commands | Command         | Description                                                                 |
|------------------|-----------------|-----------------------------------------------------------------------------|
|                  | <b>boot</b>     | Boots the router manually.                                                  |
|                  | <b>sysreset</b> | Displays the return information from the system image that was last booted. |

# dev

To list the known storage and memory devices for the router, use the **dev** command in ROM monitor mode.

**dev**

Syntax Description

This command has no arguments or keywords.

Command Default

No default behavior or values.

Command Modes

ROM monitor (>)

Command History

| Release     | Modification                                                                                                                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
| 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

Examples

The following example shows how to display the known file systems on a router:

```
rommon 3 > dev

Devices in device table:
 id name
bootflash: boot flash
 slot0: PCMCIA slot 0
 slot1: PCMCIA slot 1
 disk0: PCMCIA slot 0
 disk1: PCMCIA slot 1
 disk2: PCMCIA slot 2
 eprom: eprom

rommon 4 >
```



Note

The disk2 device is available only on a Cisco uBR7246VXR router using the NPE-G1 processor card.



**Related Commands**

| Command    | Description                                          |
|------------|------------------------------------------------------|
| <b>dir</b> | Lists the files on one of the router's file systems. |

# dir

To list the files on one of the router’s file systems, use the **dir** command in ROM monitor mode.

**dir** *device*:

|                    |                                                  |
|--------------------|--------------------------------------------------|
| Syntax Description | <i>device</i> : Specific device to be displayed. |
|--------------------|--------------------------------------------------|

|                 |                                |
|-----------------|--------------------------------|
| Command Default | No default behavior or values. |
|-----------------|--------------------------------|

|               |                 |
|---------------|-----------------|
| Command Modes | ROM monitor (>) |
|---------------|-----------------|

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Examples** The following example shows how to list the files on the slot0: and bootflash: devices.

```
rommon 40 > dir slot0:
 File size Checksum File name
 65 bytes (0x41) 0xb49d basic.cm
 2229799 bytes (0x220627) 0x469e uBR7200-k.z

rommon 41 > dir bootflash:

 File size Checksum File name
1378560 bytes (0x150900) 0x6607c732 ubr7200-kboot-mz.122.11.BC3
 16220 bytes (0x3f5c) 0x47e9a02c bundle.cfg
 76 bytes (0x4c) 0x313b6bb0 config.cm
 189250 bytes (0x2e342) 0xe95da48e crashinfo_20030515-212829

rommon 42 >
```

| Related Commands | Command    | Description                                                |
|------------------|------------|------------------------------------------------------------|
|                  | <b>dev</b> | Lists the known storage and memory devices for the router. |

# dis

To disassemble a segment of main memory, use the **dis** command in ROM monitor mode.

**dis** [*address*] [*num-of-bytes*]

|                           |                     |                                                                          |
|---------------------------|---------------------|--------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>address</i>      | (Optional) Address in main memory at which the disassembly should begin. |
|                           | <i>num-of-bytes</i> | (Optional) Number of bytes to disassemble.                               |

**Command Default** If no arguments are given, the command prompts for the *address* and *num-of-bytes* parameters.

**Command Modes** ROM monitor (>)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                            |
|------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 11.3 NA        | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                        | 12.1(5)EC      | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                        | 12.2(4)BC1     | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                        | 12.3BC         | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                        | 12.2(33)SCA    | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |
|                        |                |                                                                                                                                                                                                                                |

**Examples** The following example shows a typical disassembly:

```
rommon 23 > dis 0x60696358 0x20
```

```
0x60696358: 1040012b beq v0, zero, #0x60696808
0x6069635c: 00008821 addu s1, zero, zero
0x60696360: 8e0285d0 lw v0, -31280(s0)
0x60696364: 14400006 bne v0, zero, #0x60696380
0x60696368: 00002021 addu a0, zero, zero
0x6069636c: 0c1a2d93 jal 0x6068b64c
0x60696370: 00002021 addu a0, zero, zero
0x60696374: 8e0285d0 lw v0, -31280(s0)
```

```
rommon 24 >
```

The following example shows the command's interactive mode being used to perform the same disassembly:

```
rommon 25 > dis
```

```
Enter in hex the start address [0x0]: 0x60696358
```

```
Enter in hex the test size or length in bytes [0x0]: 0x20
```

dis

```
0x60696358: 1040012b beq v0, zero, #0x60696808
0x6069635c: 00008821 addu s1, zero, zero
0x60696360: 8e0285d0 lw v0, -31280(s0)
0x60696364: 14400006 bne v0, zero, #0x60696380
0x60696368: 00002021 addu a0, zero, zero
0x6069636c: 0c1a2d93 jal 0x6068b64c
0x60696370: 00002021 addu a0, zero, zero
0x60696374: 8e0285d0 lw v0, -31280(s0)

rommon 26 >
```

The `dis` command displays an exception if you attempt to disassemble a non-existent address or if you specify an argument that the system interprets as a non-existent address. For example, the following command shows the `dis disk0:` command being given. The system interprets the `disk0:` argument as a memory address of `0xd`, and because this address does not exist, displays the exception message:

```
rommon 3 > dis disk0:

Warning : address not word aligned, 0xd

*** TLB (Load/Fetch) Exception ***
Access address = 0xc
PC = 0xbfc11074, Cause Reg = 0x8, Status Reg = 0x3040d003

monitor: command "dis" aborted due to exception

rommon 4 >
```

Related Commands

| Command | Description                         |
|---------|-------------------------------------|
| frame   | Displays an individual stack frame. |
| stack   | Displays a stack trace.             |

# frame

To display an individual stack frame, use the **frame** command in ROM monitor mode.

**frame** [*number*]

|                           |               |                                                                                                  |
|---------------------------|---------------|--------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> | (Optional) Number of the stack frame to be displayed. The default is 0 (the most current frame). |
|---------------------------|---------------|--------------------------------------------------------------------------------------------------|

|                        |                         |
|------------------------|-------------------------|
| <b>Command Default</b> | Displays stack frame 0. |
|------------------------|-------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | ROM monitor (>) |
|----------------------|-----------------|

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

|                         |                                                                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>frame</b> command displays a particular stack frame. Use the <b>stack</b> command to list the available stack frames and their frame numbers. |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                      |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows the <b>frame</b> command being used to display the details of an individual frame displayed by the <b>stack</b> command: |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|

```
rommon 5 > stack 6
```

```
Stack trace:
```

```
PC = 0x02004adc
```

```
Frame 00: FP = 0x02003938 RA = 0x02005f2a
```

```
Frame 01: FP = 0x02003948 RA = 0x02005df0
```

```
Frame 02: FP = 0x02003960 RA = 0x020050ee
```

```
Frame 03: FP = 0x02003994 RA = 0x02004034
```

```
Frame 04: FP = 0x02003b00 RA = 0x00012ca6
```

```
Frame 04: FP = 0x02003b34 RA = 0x020a703c
```

```
rommon 6 > frame 2
```

```
Frame 02: FP = 0x02003960 RA = 0x020050ee
```

```
at 0x02003968 (fp + 0x08) = 0x02004f8d
```

```
at 0x0200396c (fp + 0x0c) = 0x0200f390
```

■ **frame**

```
at 0x02003970 (fp + 0x10) = 0x02006afc
at 0x02003974 (fp + 0x14) = 0xc0a82983
at 0x02003978 (fp + 0x18) = 0x02003a7e
at 0x0200397c (fp + 0x1c) = 0x02002630
at 0x02003980 (fp + 0x20) = 0x00000000
at 0x02003984 (fp + 0x24) = 0x02000000
at 0x02003988 (fp + 0x28) = 0x0200c4a4
at 0x0200398c (fp + 0x2c) = 0x0200f448
```

rommon 7 >

| <b>Related Commands</b> | Command         | Description                                                                 |
|-------------------------|-----------------|-----------------------------------------------------------------------------|
|                         | <b>boot</b>     | Boots the router manually.                                                  |
|                         | <b>dis</b>      | Disassembles a segment of main memory.                                      |
|                         | <b>stack</b>    | Displays a stack trace.                                                     |
|                         | <b>sysreset</b> | Displays the return information from the system image that was last booted. |

# help

To display a short list of the commands that are available at the ROM monitor prompt, use the **help** command in ROM monitor mode.

## help

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values.

**Command Modes** ROM monitor (>)

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Usage Guidelines** The **help** command displays a list of available ROM monitor commands, along with a brief description of each. To display additional details for a specific command, enter the command name followed by the **-?** option.

**Examples** The following example shows a typical display of the **help** screen:

```
rommon 12 > help
```

|               |                                       |
|---------------|---------------------------------------|
| alias         | set and display aliases command       |
| boot          | boot up an external process           |
| break         | set/show/clear the breakpoint         |
| confreg       | configuration register utility        |
| cont          | continue executing a downloaded image |
| context       | display the context of a loaded image |
| cpu_card_type | display CPU card type                 |
| dev           | list the device table                 |
| dir           | list files in file system             |
| dis           | disassemble instruction stream        |
| frame         | print out a selected stack frame      |
| help          | monitor builtin command help          |
| history       | monitor command history               |

```

meminfo main memory information
repeat repeat a monitor command
reset system reset
set show all monitor variables
show_spd show all SPD data
stack produce a stack trace
sync write monitor environment to NVRAM
sysret print out info from last system return
unalias unset an alias
unset unset a monitor variable

```

```
rommon 13 >
```

The following example shows how to display additional help for the **alias** command:

```

rommon 14 > alias -?

usage: alias [name=value]

rommon 15 >

```

| Related Commands | Command     | Description                |
|------------------|-------------|----------------------------|
|                  | <b>boot</b> | Boots the router manually. |



# history

To display the last 16 commands given at the ROM monitor prompt, use the **history** command in ROM monitor mode.

## history

### Syntax Description

This command has no arguments or keywords.

### Command Default

No default behavior or values.

### Command Modes

ROM monitor (>)

### Command History

| Release     | Modification                                                                                                                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
| 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

### Usage Guidelines

The ROM monitor keeps a record of the last commands given at the ROM monitor prompt (up to 16), similar to the way this is done with the Korn shell. Use the **history** command to display these commands, and the **repeat** command to repeat them one or more times.



#### Tip

When you use an **alias**, the **history** list includes the alias and not the actual commands that were executed.



#### Note

The **repeat** command is not added to the history list.

### Examples

The following example shows how to reset the ROM monitor and return it to a known state:

```
rommon 9 > history

1 boot sysfiles/ubr10k-k8p6-mz.12211BC3
2 dev
3 dir disk0:
4 confreg
```

**history**

```
5 confreg 0x00
6 cont
7 break -c
8 break
9 history
```

```
rommon 10 >
```

**Related Commands**

| Command       | Description                                            |
|---------------|--------------------------------------------------------|
| <b>alias</b>  | Defines an alias to be used at the ROM monitor prompt. |
| <b>boot</b>   | Boots the router manually.                             |
| <b>repeat</b> | Repeats a particular ROM monitor command.              |

# meminfo

To display information about the available range of main memory and Flash memory, use the **meminfo** command in ROM monitor mode.

## meminfo

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values.

**Command Modes** ROM monitor (>)

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Usage Guidelines** The **meminfo** command displays the size of available main memory, its starting address, the size of available packet memory, and the size of nonvolatile Flash memory.

**Examples** The following example shows how to display information about the current memory usage:

```
rommon 9 > meminfo
```

```
Main memory size: 512 MB.
Available main memory starts at 0xa000e000, size 0x7ffc8 KB
NVRAM size: 0x80000
```

```
rommon 10 >
```

| Related Commands | Command         | Description                                                                 |
|------------------|-----------------|-----------------------------------------------------------------------------|
|                  | <b>boot</b>     | Boots the router manually.                                                  |
|                  | <b>sysreset</b> | Displays the return information from the system image that was last booted. |

# repeat

To repeat a particular ROM monitor command from the history list, use the **repeat** command in ROM monitor mode.

**repeat** [*number* [*count*] | *string* [*count*] ]

**Syntax Description**

|               |                                                                                                                                                                                                                                     |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>number</i> | (Optional) Specifies the number, as listed in the <b>history</b> command, of the command to be repeated.                                                                                                                            |
| <i>string</i> | (Optional) Specifies a string to be compared against the commands in the history list. The most recent command that matches the <i>string</i> is repeated. If the <i>string</i> includes spaces, it must be enclosed within quotes. |
| <i>count</i>  | (Optional) Specifies the number of times the command should be executed. The default is 1.                                                                                                                                          |

**Command Default**

If given without any arguments, repeats the previous command once.

**Command Modes**

ROM monitor (>)

**Command History**

| Release     | Modification                                                                                                                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
| 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Usage Guidelines**

The **repeat** command repeats one of the commands in the history list (which can contain up to 16 commands). You can specify the command to be repeated by its history number (as shown by the **history** command) or by a string that will match the command.

If you do not give any arguments with the command, it repeats the last command in the history list once.



**Note**

The **repeat** command is not added to the history list, so you cannot repeat the **repeat** command. You also cannot include the **repeat** command on a command line that has multiple commands separated by a semicolon delimiter.

## Examples

The following example shows how to use the repeat command to execute one of the commands in the history list:

```
rommon 9 > history

1 boot sysfiles/ubr10k-k8p6-mz.12211BC3
2 dev
3 dir disk0:
4 confreg
5 confreg 0x00
6 cont
7 break -c
8 break
9 history

rommon 10 > repeat 9

1 boot sysfiles/ubr10k-k8p6-mz.12211BC3
2 dev
3 dir disk0:
4 confreg
5 confreg 0x00
6 cont
7 break -c
8 break
9 history
10 history

rommon 11 >
```

## Related Commands

| Command         | Description                                                                 |
|-----------------|-----------------------------------------------------------------------------|
| <b>boot</b>     | Boots the router manually.                                                  |
| <b>history</b>  | Displays the last 16 commands given at the ROM monitor prompt.              |
| <b>sysreset</b> | Displays the return information from the system image that was last booted. |

# reset

To reinitialize the ROM monitor and return it to a known state, use the **reset** command in ROM monitor mode.

**reset** [-s]

|                    |    |                                                                                                                                 |
|--------------------|----|---------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | -s | (Optional) Saves the current environment (environment variables and aliases) to nonvolatile memory before performing the reset. |
|--------------------|----|---------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                           |  |
|----------|-----------------------------------------------------------------------------------------------------------|--|
| Defaults | If given without any arguments, resets all environment variables and aliases to their initialized states. |  |
|----------|-----------------------------------------------------------------------------------------------------------|--|

|               |                 |  |
|---------------|-----------------|--|
| Command Modes | ROM monitor (>) |  |
|---------------|-----------------|--|

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command ws integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                      |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Usage Guidelines | <p>The <b>reset</b> command returns the ROM monitor to its initial state, without requiring a complete system reboot by performing a warm reset. This is useful if you have been setting and unsetting registers and variables, and no longer know whether the system is in a stable state.</p> <p>If you specify the <b>-s</b> option, the system saves the current environment variables and aliases to nonvolatile memory before resetting the ROM monitor, so as to preserve their current values.</p> |  |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

|          |                                                                                                                                                                                                                                                                                                                                                                         |  |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Examples | <p>The following example shows how to reset the ROM monitor and return it to a known state:</p> <pre>rommon 59 &gt; <b>reset</b>  System Bootstrap, Version 12.0(9r)SL2, RELEASE SOFTWARE (fc1) Copyright (c) 2000 by cisco Systems, Inc.  Reset Reason Register = RESET_REASON_RESET_REG (0x76) C10000 platform with 524288 Kbytes of main memory  rommon 1 &gt;</pre> |  |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

| Related Commands | Command         | Description                                                                 |
|------------------|-----------------|-----------------------------------------------------------------------------|
|                  | <b>boot</b>     | Boots the router manually.                                                  |
|                  | <b>sysreset</b> | Displays the return information from the system image that was last booted. |

# set

To display the contents of the currently-defined environment variables, use the **set** command in ROM monitor mode.

**set**

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values.

**Command Modes** ROM monitor (>)

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Usage Guidelines** The set command displays the environment variables that are currently defined in the ROM monitor. Variables are defined at the ROM monitor prompt in a manner similar to that of the Korn shell, by specifying *variable=value*.



**Tip** Use the **unset** command to delete a monitor variable.

**Examples** The following example shows how to display the values of the currently defined monitor variables:

```
rommon 13 > set

PS1=rommon ! >
RET_2_RTS=17:28:46 PST Tue Oct 12 1993
BSI=0
RET_2_RUTC=
?=1

rommon 14 >
```



The following example shows the PS1 variable (which defines the ROM monitor prompt) being changed, and the **set** command displaying the new value:

```
rommon 12 > PS1="Rommon-CMTS ! >"
Rommon-CMTS 13 > set

PS1=Rommon-CMTS ! >
RET_2_RTS=17:28:46 PST Tue Oct 12 1993
BSI=0
RET_2_RUTC=
?=1

Rommon-CMTS 14 >
```

**Related Commands**

| Command      | Description                                                                             |
|--------------|-----------------------------------------------------------------------------------------|
| <b>sync</b>  | Writes the current values of aliases and monitor environment variables to Flash memory. |
| <b>unset</b> | Deletes the current contents of a monitor environment variable.                         |

# show\_spd

To display the contents of the processor’s Serial Presence Detect (SPD) device (an electrically erasable programmable read-only memory (EEPROM) device), use the **show\_spd** command in ROM monitor mode.

**show\_spd**

**Syntax Description**    This command has no arguments or keywords.

**Command Default**    No default behavior or values.

**Command Modes**    ROM monitor (>)

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Usage Guidelines**    The **show\_spd** command displays the contents of the processor card’s SPD/EEPROM memory device. This information is typically useful only to Cisco TAC engineers.



**Note**    The **show\_spd** command displays a large volume of data. Enable the capture buffer on your terminal program so that you can preserve this data and review it later.

**Examples**    The following example shows how to display the SPD data (only a portion of the command’s display is shown):

```
rommon 15 > show_spd

DIMM 0 SPD specifications:
byte 0 - 0x80000000
byte 1 - 0x80000000
byte 2 - 0x40000000
...
byte 125 - 0xff000000
byte 126 - 0x64000000
```

```
byte 127 - 0xad000000

DIMM 1 SPD specifications:
byte 0 - 0xff000000
byte 1 - 0xff000000
byte 2 - 0xff000000
...
byte 125 - 0xff000000
byte 126 - 0xff000000
byte 127 - 0xff000000

DIMM 2 SPD specifications:
byte 0 - 0xff000000
byte 1 - 0xff000000
byte 2 - 0xff000000
...
byte 125 - 0xff000000
byte 126 - 0xff000000
byte 127 - 0xff000000

DIMM 3 SPD specifications:
byte 0 - 0xff000000
byte 1 - 0xff000000
byte 2 - 0xff000000
...
byte 125 - 0xff000000
byte 126 - 0xff000000
byte 127 - 0xff000000

DIMM 0: Tclk cycle time = 12, Tac access from clk = 7
DIMM 0: Trp precharge = 20
DIMM 0: Trcd RAS to CAS = 20

DIMM 1: Tclk cycle time = 15, Tac access from clk = 15
DIMM 1: Tclk = 15 may NOT support CL = 2
DIMM 1: Tac = 15 may NOT support CL = 2
DIMM 1: Trp precharge = 255
DIMM 1: Trp = 255 CANNOT support SRASPrchg = 2
DIMM 1: Trcd RAS to CAS = 255
DIMM 1: Trcd = 255 CANNOT support SRASStoSCAS = 2

DIMM 2: Tclk cycle time = 15, Tac access from clk = 15
DIMM 2: Tclk = 15 may NOT support CL = 2
DIMM 2: Tac = 15 may NOT support CL = 2
DIMM 2: Trp precharge = 255
DIMM 2: Trp = 255 CANNOT support SRASPrchg = 2
DIMM 2: Trcd RAS to CAS = 255
DIMM 2: Trcd = 255 CANNOT support SRASStoSCAS = 2

DIMM 3: Tclk cycle time = 15, Tac access from clk = 15
DIMM 3: Tclk = 15 may NOT support CL = 2
DIMM 3: Tac = 15 may NOT support CL = 2
DIMM 3: Trp precharge = 255
DIMM 3: Trp = 255 CANNOT support SRASPrchg = 2
DIMM 3: Trcd RAS to CAS = 255
DIMM 3: Trcd = 255 CANNOT support SRASStoSCAS = 2

rommon 16 >
```

 show\_spd

| Related Commands | Command | Description                                                                             |
|------------------|---------|-----------------------------------------------------------------------------------------|
|                  | sync    | Writes the current values of aliases and monitor environment variables to Flash memory. |
|                  | unalias | Deletes a currently-defined alias.                                                      |

# stack

To display a stack trace, use the **stack** command in ROM monitor mode.

**stack** [*number*]

|                           |                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <i>number</i> (Optional) Number of stack frames to display. The default is 5 frames. |
|---------------------------|--------------------------------------------------------------------------------------|

|                        |                         |
|------------------------|-------------------------|
| <b>Command Default</b> | Displays 5 stack frames |
|------------------------|-------------------------|

|                      |                 |
|----------------------|-----------------|
| <b>Command Modes</b> | ROM monitor (>) |
|----------------------|-----------------|

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

|                         |                                                                                                                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Usage Guidelines</b> | The <b>stack</b> command displays a stack trace of the most recently booted software image. This trace includes the value of the program counter and the selected number of frames from the kernel stack and process stack (if available) from that software image. |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Tip**

To display details for an individual frame stack, use the **frame** command.

|                 |                                                                         |
|-----------------|-------------------------------------------------------------------------|
| <b>Examples</b> | The following example shows how to display a stack trace with 6 frames: |
|-----------------|-------------------------------------------------------------------------|

```
rommon 5 > stack 6
```

```
Stack trace:
```

```
PC = 0x02004adc
```

```
Frame 00: FP = 0x02003938 RA = 0x02005f2a
```

```
Frame 01: FP = 0x02003948 RA = 0x02005df0
```

```
Frame 02: FP = 0x02003960 RA = 0x020050ee
```

```
Frame 03: FP = 0x02003994 RA = 0x02004034
```

```
Frame 04: FP = 0x02003b00 RA = 0x00012ca6
```

```
Frame 04: FP = 0x02003b34 RA = 0x020a703c
```

```
rommon 6 >
```

The following example shows how to display a stack trace with the default of 5 frames, when a process stack is available:

```
rommon 21 > stack
Kernel Level Stack Trace:
Initial SP = 0x61bb4d30, Initial PC = 0x606931b0, RA = 0x6067bca0
Frame 0 : FP= 0x61bb4d30, PC= 0x606931b0, 0 bytes
Frame 1 : FP= 0x61bb4d30, PC= 0x6067bca0, 24 bytes
Frame 2 : FP= 0x61bb4d48, PC= 0x6068db30, 48 bytes
Frame 3 : FP= 0x61bb4d78, PC= 0x6069157c, 32 bytes
Frame 4 : FP= 0x61bb4d98, PC= 0x606905e0, 88 bytes

Process Level Stack Trace:
Initial SP = 0x80007e08, Initial PC = 0x60696358, RA = 0x60699080
Frame 0 : FP= 0x80007e08, PC= 0x60696358, 192 bytes
Frame 1 : FP= 0x80007ec8, PC= 0x606939d0, 56 bytes
Frame 2 : FP= 0x80007f00, PC= 0x60008c94, 32 bytes
Frame 3 : FP= 0x80007f20, PC= 0x80008ae0, 32 bytes
Frame 4 : FP= 0x80007f40, PC= 0x80008840, 128 bytes

rommon 22 >
```

Related Commands

| Command         | Description                                                                 |
|-----------------|-----------------------------------------------------------------------------|
| <b>boot</b>     | Boots the router manually.                                                  |
| <b>dis</b>      | Disassembles a segment of main memory.                                      |
| <b>frame</b>    | Displays an individual stack frame.                                         |
| <b>sysreset</b> | Displays the return information from the system image that was last booted. |

# sync

To write the current values of aliases and monitor environment variables to Flash memory, use the **sync** command in ROM monitor mode.

## sync

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values.

**Command Modes** ROM monitor (>)

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Usage Guidelines** The **sync** command writes the current values of the monitor environment variables and aliases to Flash memory so that they are read on the next reset. If you do not do this, all variables and aliases are deleted upon reset and replaced with the default values.

**Examples** The following example shows how to synchronize the monitor variables and aliases:

```
rommon 39 > sync
```

```
rommon 40 >
```

| Related Commands | Command         | Description                                                                 |
|------------------|-----------------|-----------------------------------------------------------------------------|
|                  | <b>alias</b>    | Defines an alias to be used at the ROM monitor prompt.                      |
|                  | <b>boot</b>     | Boots the router manually.                                                  |
|                  | <b>set</b>      | Displays the currently-defined monitor environment variables.               |
|                  | <b>sysreset</b> | Displays the return information from the system image that was last booted. |

■ sync

| Command        | Description                                                     |
|----------------|-----------------------------------------------------------------|
| <b>unalias</b> | Deletes a currently-defined alias.                              |
| <b>unset</b>   | Deletes the current contents of a monitor environment variable. |



# sysreset

To display information about the system image that was last booted, use the **sysreset** command in ROM monitor mode.

## sysreset

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values.

**Command Modes** ROM monitor (>)

| Command History | Release     | Modification                                                                                                                                                                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
|                 | 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
|                 | 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
|                 | 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
|                 | 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

**Usage Guidelines** The **sysreset** command displays the information about the last system image that was booted and then terminated. This includes the reason for why the last image ended its execution, the values of the program counter and error address registers when the program ended execution, and a stack trace holding the last eight frames. Any exception information is also shown.

**Examples** The following example shows a typical display from the **sysreset** command:

```
rommon 22 > sysreset

System Return Info:
count: 19, reason: user reload
pc:0x6053059c, error address: 0x0
Stack Trace:
FP: 0x6558b0d0, PC: 0x6053059c
FP: 0x6558b0d0, PC: 0x605163a4
FP: 0x6558b0e8, PC: 0x60535b84
FP: 0x6558b170, PC: 0x60488c50
FP: 0x6558b268, PC: 0x60474aa8
FP: 0x6558b2c8, PC: 0x6014d5d0
```

```
FP: 0x6558b2e8, PC: 0x60487928
FP: 0x6558b378, PC: 0x604fe80c
```

```
rommon 23 >
```

**Related Commands**

| Command      | Description                                                   |
|--------------|---------------------------------------------------------------|
| <b>boot</b>  | Boots the router manually.                                    |
| <b>reset</b> | Reinitializes the ROM monitor and return it to a known state. |

# unalias

To delete a currently-defined alias, use the **unalias** command in ROM monitor mode.

**unalias** *name* [*name2 name3 ...*]

## Syntax Description

|                        |                                                        |
|------------------------|--------------------------------------------------------|
| <i>name</i>            | Specifies the alias to be deleted.                     |
| <i>name2 name3 ...</i> | (Optional) Specifies additional aliases to be deleted. |

## Command Default

No default behavior or values.

## Command Modes

ROM monitor (>)

## Command History

| Release     | Modification                                                                                                                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
| 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

## Usage Guidelines

The **unalias** command deletes one or more aliases that you have previously defined for the ROM monitor using the **alias** command.

## Examples

The following example shows how to delete one alias:

```
rommon 13 > unalias dird
```

```
rommon 14 >
```

The following example shows three aliases being deleted:

```
rommon 20 > unalias alias1 alias2 alias3
```

```
rommon 21 >
```

The following example shows the error message that is displayed when you try to delete an alias that does not exist:

```
rommon 11 > unalias gobbledegook
```

```
unalias: "gobbledegook" does not exist
```

```
rommon 12>
```

**Related Commands**

| Command      | Description                                                                             |
|--------------|-----------------------------------------------------------------------------------------|
| <b>alias</b> | Defines an alias to be used at the ROM monitor prompt.                                  |
| <b>sync</b>  | Writes the current values of aliases and monitor environment variables to Flash memory. |

# unset

To delete the current contents of a monitor environment variable, use the **unset** command in ROM monitor mode.

```
unset name [name2 name3 ...]
```

## Syntax Description

|                        |                                                          |
|------------------------|----------------------------------------------------------|
| <i>name</i>            | Specifies the variable to be cleared.                    |
| <i>name2 name3 ...</i> | (Optional) Specifies additional variables to be cleared. |

## Command Default

No default behavior or values.

## Command Modes

ROM monitor (>)

## Command History

| Release     | Modification                                                                                                                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.3 NA     | This command was introduced on Cisco uBR7200 series routers.                                                                                                                                                                   |
| 12.1(5)EC   | Support was added for Cisco uBR7100 series routers.                                                                                                                                                                            |
| 12.2(4)BC1  | Support was added for the Cisco uBR10012 router. Changes were also made to the boot procedure after breaking into ROMMON to ensure that all hardware and software registers are in a known state before loading the new image. |
| 12.3BC      | This command was integrated into Cisco IOS Release 12.3BC.                                                                                                                                                                     |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.                                                                                                             |

## Usage Guidelines

The **unset** command clears the contents of one or more monitor variables that have been defined in the ROM monitor. Variables are defined at the ROM monitor prompt in a manner similar to that of the Korn shell, by specifying *variable=value*.

## Examples

The following example shows how to delete a variable named “temp-var”:

```
rommon 13 > unset temp-var
```

```
rommon 14 >
```

The following example shows how to delete two variables:

```
rommon 17 > unset temp-var my-var
```

```
rommon 18 >
```

## Related Commands

| Command     | Description                                                                             |
|-------------|-----------------------------------------------------------------------------------------|
| <b>set</b>  | Displays the currently-defined monitor environment variables.                           |
| <b>sync</b> | Writes the current values of aliases and monitor environment variables to Flash memory. |



